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Two phases, seemingly inconsistent with each other, of state control of railways in Europe are worth attention from the viewpoint of this side of the Atlantic. In Austria, after a trial of government operation of the railways, there is now a sentiment back toward private ownership. There has been in their management an evolution downward into all the ills of state control—lack of enterprise, bad service, financial loss and pernicious political activity among the railway servants. *Per contra*, a railway commission of high character has reported in favor of the amalgamation of the railways of Ireland and a majority of the commission favors government ownership and control, for substantially three of the economic reasons which are compelling Austrian sentiment in the opposite direction. What calls for careful attention in this case is the fact

that a political and civic divergency probably explains, to a large degree, the economic inconsistency. England, mightily to her credit and by virtue of her merit system, has divorced her functional public service from politics and partisanship as well as her municipal service. In Ireland's case her experts, with the political ingredient excluded, more readily take the optimistic view of government railway ownership even though it differs from the private ownership system of England and Scotland. But Austria—much scored, it will be recalled, by Gladstone for her unprogressiveness—has allowed the political and partisan impulse full play on her railways, and, presumptively, this accounts also for their economic failure. The object lesson for our own land is an impressive one. We have the merit system in our federal service as yet only on a minor scale. Until it becomes firm, dominant and pervasive both in letter and spirit, where would we find ourselves politically and economically with many hundreds of thousands of railway voters on the federal payroll? May there not be also a further lesson bearing on our own governmental tendencies in this development of politics on the Austrian railways under an imperial and centralized national administration?

THE Interstate Commerce Commission has sent out the blanks on which the railways are to report accidents under the revised law, which went into effect July 6. (The commission recommends that the new forms be used for the whole of the month of July, thus obviating the necessity of making two reports.) As the reader will recall, the principal change which has been made in the law is that requiring reports to be made monthly, in detail, of accidents to persons other than passengers and employees, such as deaths and injuries of wayfarers at highway crossings; of persons other than passengers at stations, and of trespassers stealing rides on freight trains or walking along the tracks. By requiring these additions to the monthly reports the commission is enabled to relieve the railways of making any report whatever of accidents in connection with their annual financial reports. The quarterly bulletins will be the only accident records published. The instructions sent out with the new blanks indicate that, so far as reporting *causes* is concerned, the commission itself has made a change which is of more consequence than that prescribed by Congress; it has authorized the omission of detailed reports of practically all accidents to employees which do not occur in connection with the movement of cars or engines. These are to be reported only in the totals. This will reduce the number of individual reports to be sent in by the roads each month by several thousand—by enough, perhaps, to offset the increase in the number of reports due to the addition of the trespassers and the highway crossing accidents. (Where the cause is reported, a separate sheet has to be sent for each accident.) Those accidents for which causes are not to be reported are embraced in the following five items in each monthly summary:

"Industrial accidents" to employees:
While working on tracks or bridges.
At stations, freight houses, engine houses, coaling stations, water stations, etc., where no moving railway car or engine is involved.
In and around shops.
On boats and wharves.
At other places.

Of these five items, the third and fourth represent accidents which have not heretofore appeared in the monthly reports. They have been published only in the annual statistical report of the commission. These will now appear in the monthly totals, but no causes are to be given. The first, second and fifth items have heretofore appeared in Table 1 of the quarterly bulletin, mostly in the last item of that table ("other causes"). Under the new arrangement an accident to a track laborer occurring in connection with the movement of a train—as, for example, when he is struck or run over by a locomotive—will appear in the same place in the table as heretofore; but such an accident as injury by the fall of a derrick or the dropping of a rail on the foot will appear only in the totals. The changes which have been made in the regulations will abolish the de-

tailed classification of employees which has heretofore been given in the annual statistical reports of the commission (pages 104-118 of the volume for the year 1908).

THE changes here outlined are all in the direction of simplicity and economy. The absurd retention of the accident records in the annual financial reports after monthly reports were required were necessitated by the careless language of the accident law of 1901, which omitted certain classes. After nine years this error is now corrected. The separation of "industrial" accidents from the others will be entirely proper, for the federal government has no legitimate function to perform concerning these classes. In gathering the total numbers of such accidents—a mere taking of a census—the commission aids students in getting a view of the facts in the country as a whole, and the report therefore will be a convenience; and that is enough. The prevention of accidents comes within the police power, and that rests primarily with the individual states. The federal government is justified in going into details in this matter only where the states have neglected to act, or where it is plain that they cannot do so efficiently. This is the case in reference to deaths and injuries due to collisions, derailments and boiler explosions, while in the matter of shop accidents and such like it is not. Work in shops has only an indirect connection with interstate commerce and it is doubtful whether the federal government ought to worry itself over those accidents, anyway; while in the case of the ordinary accidents happening to men engaged in track work, bridge work, etc., the government probably could not do anything helpful, however hard it might try. In the prevention of train accidents the federal government has a useful function for the reason—one among others—that the lessons of the worst accidents seem to have no influence on the minds of the public—or even, in many cases, the minds of railway officers—except as the facts for the whole country are massed in a single impressive presentation. We have all become so hardened that no one state has enough big wrecks to stir our sensibilities. The changes now made will make it impossible to compare the future with the past except by making certain allowances and groupings in the figures, and the establishment of a new class, "industrial accidents," is likely to puzzle superintendents sometimes in deciding what really is a railway accident. But the comparisons will afford all necessary lessons, for railway officers know well enough, already, what should be done in the way of prevention; while any doubts as to classification may be safely settled by advertizing to the rules which have heretofore been followed in making up the classification for the annual report. Moreover, the requirements imposed in connection with the reports which have to be made by most roads in the individual states can be used as a check to prevent the omission of any case that really ought to be included.

A PRESS despatch in the daily papers says that the Baltimore & Ohio Southwestern has made a record in the installation of block signals, having put in 183 miles in $6\frac{1}{2}$ days. The haste was due to a recent trip over the road by President Willard, who was amazed at the traffic conditions on this part of the system. The Indiana division has the greatest density of traffic of the entire system and owing to the lack of safety devices freight trains were unable to get over the road with sufficient speed to keep the line clear. In the $6\frac{1}{2}$ days (beginning July 15) three ordinary gangs of men strung 183 miles of block wire. This was from Storrs to the Wabash river at Vincennes, and from North Vernon to New Albany. In this time 62 offices were equipped with batteries and instruments and put in operation. This statement is noteworthy as illustrating the difference of opinion between President Willard and those railway officers, evidently shortsighted, who expatiate on the great reduction in the capacity of a road which must result from the use of the block system. The statement about excessive traffic density may be due to a reporter's inaccuracy; but, whatever

the density, we have the statement that the block system is being introduced for the purpose of expediting trains. And the blocks are not short; 62 in 183 miles makes an average length of three miles. This statement is noteworthy also as demolishing the bugbear that it is possible to introduce the block system only by slow degrees. This journal has for years advocated the introduction of the block system on the assumption that it could be adopted anywhere in the space of a few months; but those railways which have taken no action have seemed to discredit this assumption. The bill which has been before Congress for the past five years allows three years—a much longer time than is necessary. With a decently adequate force of telegraphers the introduction of the block system has never necessarily involved on any road any greater task than the instruction of those telegraphers in a new system, which would be simpler than the old; and with the telephone available everywhere, as it now is, the old excuse that operators for the additional stations could not be quickly gathered is done away with. It is true that to secure *both* safety and celerity most roads, in adopting the block system, will find it necessary to shorten the distances between stations; but there is little difficulty in adopting the *system* with any length of block. It can then be used for passenger trains, and for all trains in case of need, while still allowing the superintendent to facilitate the movement of freight trains, when conditions are favorable, by suspending the system; that is, by employing permissive blocking. In connection with this action of the Baltimore & Ohio Southwestern it is to be observed that though several railways in Indiana have made pleas for delay in complying with the compulsory law of that state, they have not based their arguments on physical inability to make the change, but rather on the ground that they did not deem the improvement necessary. The old, uncertain time-interval and flagging system, supplemented by despatchers' orders, torpedoes and fusees, was safe enough for them.

THE HEARINGS ON ADVANCES IN RATES.

LAST Monday in New York the Interstate Commerce Commission began the first of a series of hearings on the question whether the railways are entitled to raise their freight rates. We are making history these days, and these hearings and their results will occupy no unimportant place in the history of transportation and government regulation of railways in the United States. The fact that they will decide whether shippers in the immediate future must pay, and railways shall receive, higher rates is of consequence. But it is of secondary importance as compared with the precedent that will be established by this first exercise by the commission of its new power to permit or forbid increases in freight rates. If the commission conducts the hearings wisely and fairly and renders decisions just in themselves and based on sound principles, it will establish a precedent that will contribute much to making government regulation successful. In so far as it falls short of this it will establish a precedent that will tend to make government regulation a failure and increase the danger of government ownership. The movement for more and more drastic regulation of railways is a part of a much wider movement in the direction of state socialism. That this is true, every clear-sighted and candid man must see and admit, whether he is in sympathy with or antagonistic to the tendency. The commission, by dealing with the railways on commonsense, commercial principles and giving solid, convincing reasons for doing so can help to check this tendency. If it deals with the roads according to the principles which have been growing more and more dominant in our political and industrial life ever since the Populist party sprang into existence 20 years ago, it will help to bring state socialism nearer.

In order that a question may be intelligently discussed and wisely settled it is necessary that those who discuss and decide it shall clearly understand what is the real issue involved. The discussions of the question of an advance in freight rates indicate that many of those who have been talking about it have

not got clearly in mind just what is the issue to be determined by the commission. Many of the spokesmen for the railways have presented data in speeches, pamphlets, etc., showing conclusively that the unit costs of railway labor and materials have increased, and have stopped there, seeming to think that this demonstrated that the roads are entitled to higher rates. In reply, many shippers have presented data showing just as conclusively that the net earnings of the railways have largely increased since 10 or 15 years ago, and have stopped there, assuming apparently that this demonstrated that rates ought not to be increased. Both these arguments are inconclusive. The Mann-Elkins act, under which the commission is conducting these hearings, authorizes it to inquire into the "propriety" of any new rates, and "after full hearing * * * to make such order in reference to such rate * * * as would be proper in a proceeding initiated after the rate * * * had become effective." It provides further that "at any hearing involving a rate increased after January 1, 1910, * * * the burden of proof to show that the increased rate or proposed *increased rate is just and reasonable* shall be upon the common carrier." The real question, therefore, which the commission has to determine is whether the new rates which the roads propose to make would be just and reasonable. All data regarding increases in the cost of railway labor and supplies, and regarding increases in railway earnings is valueless except as they throw light upon this point.

In determining whether rates already in effect are, or proposed rates will be, reasonable, the commissions and courts must give primary consideration to the effect they have or probably will have on the movement of traffic. It is a well-established legal principle that a common carrier cannot charge a rate that is unfairly discriminatory or that is extortionate—in other words, one that exceeds the value of the service rendered—even if otherwise the carrier cannot make any profit at all. It is an equally well-established legal principle that, as long as its rates are not discriminatory or extortionate, the carrier has a right to make them high enough to earn at least a "fair return." In the determination of the questions whether proposed rates would be unreasonable *per se*, and whether proposed advances are necessary to enable the roads, or any of them, to earn a "fair return," the commission will perform a quasi-judicial function. Whether without proof that the proposed rates will be unreasonable *per se*, the commission can forbid the roads to put them into effect because it may think that they will enable the roads to earn more than a "fair return"; in other words, because it may think they will enable the roads to earn more than the minimum to which the courts have held they may be restricted—is a disputable point. In any event, it is certain that the commission may, if it sees fit, let the roads charge rates which will enable them to earn more than the minimum to which the courts have said they may constitutionally be held down. For it performs legislative as well as judicial functions. Its power to fix rates for the future is purely a legislative function delegated to it by Congress. In performing a duty delegated by Congress it ought to proceed as Congress ought to proceed if Congress performed the function itself. Now, Congress, in passing laws, does not impose on those affected the heaviest burdens or restrict them within the narrowest limits that it constitutionally can. Its taxing power, for example, is practically unlimited, but it does not therefore impose the highest taxes it can. Congress does not consider merely what it is constitutional to do, but it gives preponderant consideration to what it is in the interest of public expediency to do. Similarly, in exercising its legislative function of fixing rates, the commission ought to seek, not to limit the railways to the least to which they can constitutionally be restricted, but to make those rates which will be most conducive to the public welfare. And the rates which will be most conducive to the public welfare are neither the highest that shippers can possibly afford to pay nor the lowest on which railways possibly can continue to do business, but a mean between these extremes.

In determining the most expedient rates to make, the commission cannot fix its gaze exclusively on the railway business. It must consider it in relation to other businesses. The welfare of all other industries demands that transportation facilities be improved and increased. In order that they may be improved and increased, the railways must get their reasonable share of new capital. When they go into the market for new capital they meet bidders representing other lines of business. If their earnings are not as large in proportion as those of other businesses, they cannot bid as much for capital as other businesses. And if they cannot bid as much for it they will not get as much of it as not only their own interests but those of other businesses require that they shall get. So, the question which the commission ought to consider is not merely whether the railways must have higher rates in order to escape bankruptcy, but whether they must have higher rates in order to enable them to hold their own against other bidders in the money market, and thereby to get enough capital adequately to improve and develop their facilities.

In performing its legislative function of determining and deciding what in the interest of public expediency shall be done about railway rates, the commission will have as hard a task as ever was imposed on any public body. In too many instances the lawyers who conduct rate cases have darkened council with legal technicalities instead of illuminating it with economic facts and considerations. No doubt the commission often has felt like the old darky who, being caught in a violent thunderstorm, prayed to the Lord for less noise and more light. The mighty preparations that both the shippers and the railways have been making for the hearings on advances in freight rates give ground for the hope that on this occasion if there is much noise there will also be much light, and that the light will be so turned on as to help the commission not only in the performance of its quasi-judicial function but also in the performance of its legislative function. The courts can ascertain better than the commission what the legal rights of railways and shippers are. The commission's great task, especially since the commerce court law was enacted, is to pass not on legal questions but on the much bigger and much more important question of public expediency involved. May it prove equal to carrying its heavy burden of duty and responsibility!

THE LEHIGH VALLEY.

THE question whether a given annual report of a large railway company indicates a general change for the better in business conditions, or whether the improvement shown in the report is the result of an improvement in individual management, is always an interesting question; it is especially so in the case of the first report received each year.

The showing made by the Lehigh Valley for the fiscal year ended June 30, 1910, is surprisingly good. The total operating revenues amounted to \$36,200,000, an increase of \$3,000,000 over 1909, or a gain of over 9 per cent. Operating expenses amounted to \$21,700,000, an increase of about \$1,100,000. Income other than operating earnings also increased, amounting in 1910 to \$1,100,000. The net income, therefore, after the deduction of interest on funded debt and \$840,000 for additions and betterments, amounted to \$7,200,000 in 1910. In 1909 about \$580,000 was charged to income for additions and betterments, and the net income amounted to \$5,260,000.

The Lehigh Valley is, next to the Delaware, Lackawanna & Western, the most important hard coal road in the country. It operated in 1910 1,440 miles of line. The main line runs from Jersey City, N. J., to Buffalo, N. Y. The main line is all double track and runs through the anthracite coal region around Wilkes-Barre and Pittston. Of the total tonnage carried by the road 52 per cent. was coal. This compares with 53 per cent. furnished by coal in 1909. The revenue from this coal tonnage amounts to \$15,800,000, an increase of \$990,000 in 1909. The revenue from merchandise freight amounted last year to \$14,800,000, an increase of \$1,500,000. As the passenger business of

the Lehigh Valley from the point of view of revenue is comparatively unimportant, it will be seen that the gain made in 1910 over 1909 was due principally to the increased earnings from merchandise freight tonnage.

The revenues and expenses given monthly show that the increased gain in revenue came in the last few months of the fiscal year, though it has been the generally accepted opinion that business was not better in these months than it was earlier in the year. One is forced to the conclusion, therefore, that the good results obtained by the Lehigh last year were the outcome of good management, rather than a generally improved business situation. President Thomas ascribes it in part to a more efficient traffic department but more fully to the improved service which the Lehigh Valley is giving to its patrons. He lays stress on the economies and improvements in operation that have been forced on the railways by the necessity of keeping up their earnings in the face of high operating costs, and the 1910 report of his company gives witness that the management of the Lehigh has been able to live up to these requirements.

As we have said, operating expenses amounted to \$21,700,000 in 1910, as compared with \$20,600,000 in 1909. Of the total increase of \$1,100,000, \$600,000 was in the expense of conducting transportation and \$100,000 in the expenses incident to soliciting traffic. Maintenance of way and structures cost \$3,500,000 last year, an increase of \$190,000 over the year before. Maintenance of equipment cost \$5,996,000 in 1910, an increase of \$160,000 over 1909. It might be incidentally mentioned that the accusation recently made that the railways were concealing profits through excessive charges to maintenance is effectively disproved, at least in the case of the Lehigh Valley, by the detailed statement of operating expenses in the Lehigh's annual report. The increase in expenses for maintenance of way show the natural fluctuations between various items that are shown between normal years in the report to any railway. For instance, the amount spent on ballast amounted to \$54,600 in 1910, as against \$11,800 in 1909. The amount spent for ties was \$413,000 in 1910, as against \$514,000 in 1909. Under maintenance of equipment, the entire increase in expenses is accounted for by an increase of \$310,000 in the cost of repairs of freight train cars, which amounted as a whole to \$2,400,000 last year. This increase is accounted for by the increase in traffic moved and the resulting greater car mileage. The following table shows the unit costs of maintenance in the form that we have used in reviewing previous reports:

	1910.	1909.
*Maintenance of way, per mile.....	\$1,268	\$1,223
†Repairs per locomotive	2,185	2,258
" passenger-train car	499	519
" freight-train car	58	48

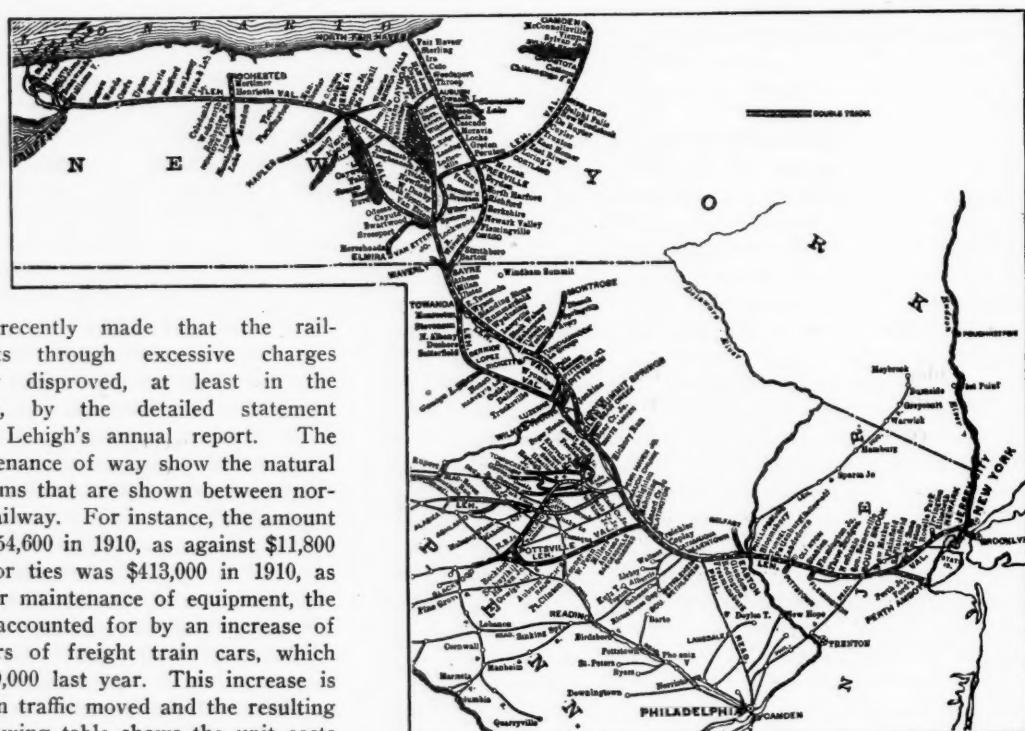
*Per mile of first, second, third, etc., main line and branches. The maintenance of two miles of sidings and switch track being counted equal to the maintenance of one mile of main line.

†This is cost of repairs only and does not include cost of renewals or depreciation.

Under transportation expenses most of the accounts show increased cost. This increased cost is due, in the case of such items as fuel for road locomotives, to the increase in traffic and consequently greater train movement. The balance of the increased cost of transportation is caused by the higher wages paid. The increase in wages began to affect the Lehigh in January, 1910, so that the last six months of the fiscal year show the effects of the new wage scale. In 1910, \$13,900,000 was paid directly to labor, as compared with \$12,300,000 paid directly to labor in 1909. There were, however, 22,469 employees in 1910, as compared with 20,731 the year before. Assuming that the entire increase in wages per employee came in the last half year the average individual raise in pay was about 10 per cent.

It has been the policy of the Lehigh in the past to spend very large sums from income for the improvement of its property. There are comparatively few roads in the East that have had to be so thoroughly rebuilt, during the last 10 or 15 years, as has the Lehigh. Last year \$5,200,000 was spent for additions and betterments, of which \$840,000 was deducted from income. The important work was the extension of third and fourth track and the improvement to property of subsidiary companies. The company was reimbursed for money advanced to these subsidiary companies by the issue of 50-year 5 per cent. debenture bonds so that the balance sheet of the company does not, on its face, show how much has been spent for additions and betterments; that is, the item, additions and betterments since 1907, does not show it, but this is shown in the profit and loss account.

The balance sheet is prepared in accordance with the rules laid down by the Interstate Commerce Commission and shows a number of changes both from previous balance sheets of the Lehigh and from what might be called standard accounting practice of American railways. President Thomas points out that under the ruling of the Interstate Commerce Commission the management was forced to show a paper profit greater by a con-



The Lehigh Valley Railroad.

siderable amount than the management thought proper. This is shown in a credit item of \$3,440,000 in the profit and loss account, representing expenditures for additions and betterments during the fiscal years, 1908, 1909 and 1910, transferred to road and equipment and to advances to subsidiary companies. The balance sheet of the company for June 30, 1910, shows it in a very strong position as regards current assets and liabilities. The company had \$10,900,000 cash in hand, comparing with \$7,200,000 in 1909. It is probable that if the balance sheet of 1909 were to be recast to conform with that of 1910, the actual difference in cash on hand would not be quite as great as here shown. In any case, \$11,000,000 is more than an ample working capital for the Lehigh Valley. Working liabilities amounted to \$3,800,000 in 1910. This compares roughly with the total current liabilities shown on the 1909 balance sheet amounting to \$3,850,000.

In June the directors decided to increase the authorized capital stock of the company from \$40,334,800 to \$80,000,000 and the stockholders approved the sale of \$20,220,550 stock to stockholders at par. The price of Lehigh Valley stock is about 72½ per

\$50 share. The sale at par, therefore, of one share of new stock for every two shares of old stock owned by stockholders was in reality a very considerable extra dividend. The proceeds of the sale of this stock will be used to pay, at maturity on September 1, \$6,000,000 second mortgage 7 per cent. bonds. The retirement of these bonds, together with the retirement of other securities during the past year, will effect an annual saving of \$505,000 in fixed charges. At the present dividend rate of 6 per cent. on the common stock, the new stock issue will call for \$1,200,000 annually. Deducting the amount saved in fixed charges, there will be only a net increase of \$700,000 in interest requirements. The surplus, after the payment of dividends last year, amounted to \$4,860,000.

It is rather interesting to compare, or, if you like, contrast, certain traffic statistics of the Lehigh Valley and the Delaware, Lackawanna & Western. The Lackawanna operates 957 miles of road, as against the 1,141 miles of the Lehigh. The freight density of the Lackawanna in the calendar year 1909 was 3,455,-117 tons carried one mile per mile of road, and the Lehigh's freight density for the fiscal year, ended June 30, 1910, was 3,288,705 tons. The total number of tons of all-revenue freight carried one mile was 4,736,557,964 for the Lehigh and 3,306,-546,605 for the Lackawanna. The average receipts per ton per mile of all freight on the Lehigh Valley was 6.46 mills. The Lehigh does not give separately its receipts per ton per mile on coal traffic and on merchandise traffic. The Lackawanna gives these figures separately. The average receipts per ton per mile on merchandise traffic on the Lackawanna was seven mills, and on coal traffic it was 8.61 mills. The train load on the Lehigh Valley was 542 tons in 1910 and on the Lackawanna 521 tons. The percentage of increase in train load in the last year reported by the Lackawanna was a little less than 8 per cent. and on the Lehigh a little more than 7 per cent. The average haul for coal and coke on the Lehigh was 154 miles, as against 186 on the Lackawanna.

President Thomas sums up his view of the present conditions and future prospects of railways as follows:

"The conditions now surrounding the railway operations in this country present an element of uncertainty and apprehension that should receive the sober and earnest reflection of investors generally. Time and experience alone will demonstrate the benefit or harm attending the methods employed by federal and state authorities in the regulation and control of the vast industries of this country. The greater difficulties now encountered in corporate management are apparent to all. The problem of offsetting the increase in rates of wages paid employees and in all of those costs entering into the expense of operating must be met. The logical and businesslike solution in this, as in any other occupation, would be an advance in the rates for service performed. If for any reason, however, the gross revenues cannot be so increased, the constantly increasing cost of this service will diminish the net revenue of the company, and it becomes, therefore, of the utmost necessity to effect the greatest possible economies in operation."

The following table shows the results of operation in 1909 and 1910:

	1910.	1909.
Average mileage operated	1,141	1,441
Coal freight revenue	\$15,821,798	\$14,831,671
Merchandise freight revenue	14,757,799	13,291,831
Passenger revenue	4,830,172	8,905,063
Total operating revenue	36,167,398	33,137,532
Maintenance of way	3,462,903	3,273,339
Maintenance of equipment	5,995,810	5,832,430
Traffic	918,720	810,293
Transportation	10,593,565	9,949,910
Total operating expenses	21,684,147	20,575,736
Taxes	1,106,762	1,079,376
Operating income	13,376,489	11,482,720
Gross corporate income	14,494,124	12,187,300
Additions and betterments	843,877	582,643
Net corporate income	7,293,524	5,261,160
Dividends	2,480,718	2,480,718
Surplus	4,862,806	2,830,442

Letters to the Editor.

HOW TO DEAL WITH FAILURES OF AUTOMATIC BLOCK SIGNALS.

Baltimore, July 22, 1910.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

The article in this week's issue (page 148) of your paper, on automatic block signal performance, is interesting and to the point.

On the B. & O. we hold meetings each month of signal supervisors, and in turn the signal supervisors hold frequent meetings, attended by the men reporting to them, and in each case these men are invited to open their hearts and tell us all about the occurrences of the previous month and especially those which inadvertently slipped through without report.

One of the principal items of discussion at our meetings is the "clear failure," although, of course, we also discuss all other failures. We have for some two years followed this practice, and notes are recorded of our discussions; the minutes of the meetings are printed each month and distributed among those persons interested. We have found that incalculable good is derived from such meetings, and the questions discussed are afterward gone over by the supervisors at the meetings with their men.

Our policy is to encourage our men to better their conditions, and only when failures occur for which they are responsible, are they criticised; they know fully that failures occurring over which they have no control will not be held against their record.

With a view to educating our men, we issue from time to time printed bulletins of various signal appliances, explaining the details of mechanisms and wiring, which is giving us the results we want, namely, loyal, intelligent and energetic workers.

Our promotions are made on the basis of merit, and every man we employ knows that his chance of promotion is good if he attends strictly to the duties required of him.

Repairmen make daily reports of all failures to signal supervisors, and they, in turn, each ten days, send a report to the division engineer. A copy of this is forwarded to the signal engineer. Special instructions that clear failures shall be reported immediately to all concerned. Committees of signal supervisors are appointed to investigate clear failures, and I am pleased to state that their services in this particular are required very seldom; but when such a failure is reported we leave nothing unturned to arrive at the cause of the trouble.

We have for years made a special point, in all cases, to invite criticism of trainmen as to the performance of all signals, so as to obtain as many checks as possible against their improper operation.

Records are kept in the signal engineer's office of the failures of each signal, so that reference may be made at any time to past performances.

F. P. PATENALL,
Signal Engineer.

TERMINAL CONTROVERSY AT ST. LOUIS.

The *Railway Age Gazette* in its issue of June 24, 1910, page 1781, published an article entitled "The Terminal Controversy at St. Louis." W. E. Been, secretary of the Arbitrary Abolition Committee, a committee representing the municipal assembly and the shippers of St. Louis, which was appointed to secure the abolition of the bridge differentials at St. Louis, has written an open letter criticizing the article referred to, and Samuel O. Dunn, the author of the article in question, has written a reply to Mr. Been's letter. Mr. Been's and Mr. Dunn's letters are given below.

St. Louis, Mo., July 26, 1910.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

Several references recently have attracted my attention to your Mr. Dunn's article in your issue of June 24 setting forth the terminal railway situation at St. Louis, and, while he has gone into detail as to conditions, etc., I do not think he has presented the layman's view of the situation as it appears to exist from

that standpoint; and why should not Mr. Jones have a clear, logical view of the situation, as he pays the freight?

First, I want to say that, in my opinion, a union terminal system is a good thing, both for the transportation lines and the shippers, provided it is handled in the right way, otherwise it is a temporary advantage to one, a detriment to the other, finally resulting in a dissolution of the cause of the trouble.

In reference to his statements as to the Terminal Railroad Association not being a monopoly, I cannot agree on that point—else why has it purchased at prices stated to be far above the real value, properties such as the so-called Conologue Railroad Interstate Car Transfer Co., the St. Louis Belt & Terminal Railway, the Alton Bridge, etc., as it was not necessary to control these in order to do the business required of it, and, while it is not the sentiment of the people of St. Louis to impede the progress and enlargement of the Terminal Railroad Association so long as it shows a disposition to share with them the economy of a union terminal system. However, they do not care to draw the cord tighter around their own necks by granting franchises upon which bonds may be later issued and their commerce levied upon heavier to pay the interest thereon.

The municipal government, in refusing to pass the proposed ordinances, felt that the terminal was now in a position to give the shippers of St. Louis a complete abolition of the differentials on all commodities between both sides of the river in return for the valuable grants which they asked, for this reason: The 14 proprietary lines of the terminal are enjoying switching facilities in the Terminal Railroad Association at the price of one—or, in other words, if all the proprietary lines would seek to each have the individual facilities they now enjoy, it would cost them 14 times as much. Now, why should they not, if they want to co-operate with the shipping trade, say, "We will reduce it down to 7 per cent. of what it now is." This is on the assumption that the 14 lines have their own money invested in the terminal, each one sharing his proportion of the cost of the entire system. On referring to an agreement signed by the 14 roads you will find a clause providing that tolls upon the traffic shall be fixed so as to provide a sufficient sum each year to pay the fixed charges of the Terminal Association, which include rent, assessments, interest, dividends on preferred stock, taxes and maintenance charges. By referring to Poor's Manual we find the Terminal Railroad Association capitalized at \$50,000,000. Taking the statement of the thirty-fourth annual report issued in 1909 of the Missouri Railroad & Warehouse Commissioners on the terminal, I quote in part:

Capital stock outstanding.....	\$2,882,000.00
Funded debt in mortgaged bonds amounting to.....	32,064,000.00
Total surplus for year ending June 30, 1909.....	4,263,431.50

From which a layman deducts the following:

The 14 proprietary lines have invested an average of \$205,857 in capital stock, assuming that each road has shared alike, while the dear public hold \$32,064,000 in bonds, with a surplus of \$4,263,431.50. A dividend would give each road \$304,531.10, or \$98,674.07 more than the individual roads have invested in the system, and this amount no doubt will be apportioned to the benefits of the roads before the Cotton Belt is admitted into the fold.

From the above figures, which I understand are given to the Railroad and Warehouse Commission by an officer of the association, signed before a notary public, it is not hard to understand why the shipping public demand of the terminal, which is only a feature of the 14 roads, a complete wiping out of the additional charges to and from East St. Louis, both east and west of the Mississippi river.

A comparison with other cities fails to reveal the fact that the terminal charges are as high as at St. Louis, even though they have not the economical advantage of union terminals, neither are they being charged more because millions are being invested in terminals by individual roads. Take, for instance, Chicago. How much more will the Chicago & Northwestern charge for switching after it has invested \$80,000,000 in terminals, or the Pennsylvania Railroad at New York city? The Baltimore

& Ohio and the Pennsylvania Railroad have bridges at Pittsburgh. Do they charge differentials over Alleghany or Alleghany over Pittsburgh? There are three bridges over the Mississippi river at St. Paul, which is ten miles from Minneapolis, yet both towns are on a parity to all points. Perhaps the bridge at Davenport, Ia., cost almost as much as our Merchants' bridge, yet do they exact a toll on the commerce of Rock Island and Davenport?

The reason the joint conference committee, composed of representatives of the municipal assembly and the commercial interests, refused to recognize the independent lines in the meeting with the terminals' interests was because it was not treating about individual rates, such as the coal roads charged, but was handling it as a general proposition; and the independent lines would have nothing whatever to say to the terminal in their final decision, though they, no doubt, would have been consulted with reference to rates on commodities which they transport.

When the question was asked of the railway representatives why the 10 cents per ton on coal was absorbed after being delivered to the western lines by the terminal, they were told by F. B. Bowes, general traffic manager of the Illinois Central, that it was because of competition; and it is the opinion of the writer that the reason of all the differentials not being absorbed is because no competition exists across the Mississippi river at St. Louis, but the continued practice of the imposing this evil on our commerce will bring competition—in fact, it is on the way. It seems that the representatives of the lines of the terminals are not alive to their opportunity of co-operating with the people, and I believe I would not be misstating a fact when I say that just such methods of this kind on the part of some of the railways of this country are what caused the people to put the management of them into the hands of a government commission.

W. E. BEEN.

Chicago, August 17, 1910.

To W. E. Been, Esq.,
Traf. Mgr., Brown Shoe Company,
1610 Washington Ave., St. Louis, Mo.:

I have read with much interest your letter of July 26, which you addressed to W. H. Boardman, president and editor of the *Railway Age Gazette*, and which was in reply to the article by me published in the *Railway Age Gazette* of June 24, entitled "The Terminal Controversy at St. Louis."

You ask, "Why should not Mr. Jones have a clear, logical view of the situation, as he pays the freight?" I assume you mean that the matter should be clearly presented from the shipper's standpoint and that you intended to do this. What the shipper is interested in securing is *good service at reasonable rates*. I undertook to show in my article that the shipper at St. Louis was being given both. You do not controvert this. On the contrary, you evade discussion both of the question of the reasonableness of the rates charged by the Terminal Association and of the question whether those services are worth what Mr. Jones pays for them.

You state that I said that the Terminal Railroad Association is not a monopoly. I said nothing whatever about whether the Terminal Association is or is not a monopoly. The question whether it is an unlawful monopoly is now under determination by the federal courts, which are competent to settle the matter.

You say that all the "fourteen proprietary lines of the Terminal are enjoying switching facilities in the Terminal Association at the price of one," and ask, "Now, why should they not, if they want to co-operate with the shipping public, say 'We will reduce it (that is, the cost of switching) down to 7 per cent. of what it now is.'" A little reflection will show that your assumption that if the proprietary lines did not jointly use the facilities of the Terminal Association each of them would have to provide as large facilities as it now has, is incorrect. No one road for the handling of its own traffic at St. Louis would require anything like as large facilities as those of the Terminal Association. It is quite true, however, that if each had to provide its own facilities the aggregate amount invested in belt lines by them at St. Louis would be larger. But do you think

it entirely reasonable to contend that the roads, in order fairly to co-operate with the shipping public, must give it *all* the benefit arising from economical methods of operation? Are the roads entitled to none of the benefits of their own good management? You state that in your opinion "a union terminal system is a good thing both for the transportation lines and the shippers, provided it is handled in the right way." The union terminal system at St. Louis is giving the shippers of your city as good service as is rendered at any terminal in the country, and better service than is rendered at a great majority of terminals. Ought not shippers to give that fact weight in considering whether its rates are fair?

You make an erroneous statement regarding the Terminal Association's capitalization. You say that by reference to Poor's Manual we find its capitalization is \$50,000,000. What Poor's Manual does show is that the stockholders have authorized its directors to issue \$50,000,000 of stock, but that the amount that actually has been issued is only \$2,882,000, and that the amount of funded debt is \$31,800,000, making a total capitalization, as stated in my article, of \$34,682,000.

You assert that other cities situated similarly to St. Louis are given better rates. Most of the examples that you cite are not apropos, as the conditions at the cities mentioned are not similar to those at St. Louis. The one point among them whose situation is most similar to St. Louis is Davenport, Iowa. Your language implies that no bridge differential is charged there. In this you are wrong. The chief complaint made against the rate adjustment at St. Louis is that the rate on coal to St. Louis from points in Illinois within 100 miles is 20 cents higher than it is to East St. Louis. Now, the fact is that the rates on coal from Illinois mines to Davenport are 5 cents per ton higher than they are to Rock Island, Ill. You will perhaps reply that the differential at St. Louis should be no higher at St. Louis than it is at Davenport. But while the differential of 20 cents against St. Louis applies only on coal originating within a radius of 100 miles, the differential against Davenport applies on coal originating at mines as much as 400 miles distant. The following are the rates on steam coal from a number of Illinois coal fields to Rock Island and Davenport: From the Cable field, 26 miles, to Rock Island, 50 cents; to Davenport, 55 cents. From the Peoria district, 90 miles, to Rock Island, 70 cents; to Davenport, 75 cents. From the Springfield district, 150 miles, to Rock Island, 82½ cents; to Davenport, 87½ cents. From southern Illinois, distances of 290 miles to 375 miles, to Rock Island, \$1.15; to Davenport, \$1.20. This differential in coal rates at Rock Island and Davenport is due to the fact that the coal must be hauled across a bridge before it can be got to Davenport. You say that "Perhaps the bridge at Davenport, Iowa, cost almost as much as our Merchant's bridge." Now, the fact is that the Eads bridge at St. Louis cost \$6,800,000 and the Merchants' bridge \$3,700,000, while the Chicago, Rock Island & Pacific's bridge across the Mississippi at Rock Island-Davenport cost \$1,100,000, of which amount one-half was paid by the federal government. Furthermore, while the average distance the Terminal Association hauls coal moving from St. Louis is about 12 miles, the average distance that coal moves in going from Rock Island, Ill., to points on railway tracks in Davenport, Iowa, is about 2 miles, the maximum haul being about 3 miles. You express the opinion that the reason why all differentials across the Mississippi river at St. Louis are not being absorbed is lack of competition between the carriers there. Why, then, has not the differential on coal been abolished at Davenport, where there is no "terminal monopoly" to complain about, but there is active competition?

You will note that the lowest rate applied on coal moving to Davenport is 55 cents, which is charged for a haul of 26 miles. Now, as you are aware, a flat rate of 52 cents is made to St. Louis for all distances up to 80 miles. On the whole, the adjustment of rates is fully as favorable—if not more favorable—to St. Louis as it is to Davenport.

You remark, "It seems that representatives of the lines in the

Terminal Association are not alive to their opportunity of co-operating with the people, and I believe I would not be misstating a fact when I say that just such methods of this kind on the part of some of the railways of this country are what caused the people to put the management of them into the hands of a government commission." One would think from reading this that you were unaware that the municipal assembly of St. Louis created a bridge and terminals commission; that as a result of the co-operation of the railways with this commission reductions in rates amounting to millions of dollars per annum were granted to the shippers of St. Louis, and that the commission resigned because after the railways had done everything it believed they reasonably could be asked to do the city refused to grant them the franchises to which the commission believed they were reasonably entitled. Your reference to the government commission suggests a renewal of the query made by me in the article which you criticized, as to why, if those who complain about the present adjustment of rates are sure of their ground, they do not appeal to this commission.

SAMUEL O. DUNN.

CRUDE OIL TREATMENT OF TIES.

BY E. O. FAULKNER,

Manager Tie and Timber Department, Atchison, Topeka & Santa Fe.
BAKERSFIELD OIL TESTS.

A few Texas, Mexico and Arizona pine trees treated with Bakersfield crude oil in a small experimental plant at our Topeka shops in February, 1902, were placed in track, situated between Cleveland, Tex., and Pelican on the Beaumont division of the Gulf, Colorado & Santa Fe, where, under conditions at that time, untreated loblolly pine ties would not last much over 18 months, nor longleaf much over two years. The ties and treatments were as follows:

Air Seasoned Ties, Treated with Bakersfield Crude Oil at Topeka, August, 1901, and Inserted in Texas Experimental Track in February, 1902. No Steaming or Vacuum Ahead of Oil Impregnations.

Tie No.	Timber.	Lbs.	Hours.	Pressure.	Gain, lbs.	Per cent. oil used.
139	Arizona, sawn.....	150	6	28	32.0	
140	New Mexico, hewn.....	150	6	66½	49.3	204° F.*
141	Texas, hewn.....	150	6	17½	23.0	
168	Arizona, sawn.....	160	6	26½	25.8	200° F.*
169	New Mexico, hewn.....	160	6	8½	10.2	to
170	Texas gum.....	160	6	30	26.3	210° F.*
171	Texas, hewn.....	155	5	62½	59.0	
172	Texas, hewn.....	155	5	62	70.0	
173	Texas, sawn.....	155	5	13	13.3	
174	Texas, sawn.....	155	5	29½	34.7	190° F.*
175	Texas, sawn.....	160	3½	21	21.1	
176	Texas, sawn.....	160	3½	46	48.7	
177	Texas, hewn.....	160	3½	51	60.0	
178	Texas, hewn.....	160	3½	82½	86.0	

*Taken out for test.

Examinations and reports of these ties have been made from time to time, the last a few weeks ago, when all were found in excellent condition, with no signs of decay; in fact, they are likely to come out for mechanical wear (rail cutting) before they do for decay. They have now been in the track eight years and three months, and are in apparent better condition than a number of the other treated ties alongside them. Nos. 140, 169 and 175 were taken out for testing purposes, being sawn in the middle and again under each rail base to examine the interior of the wood, which, in every case, was found perfectly sound. No. 169 took only 8½ lbs., but it was a heart tie; those taking the smaller quantities in each case were ties with large heart sections, the others being either hewn loblolly or New Mexico pines. These ties have already lasted more than four times the life of untreated ones, and the end it not yet. The exposed portion of each tie is completely enveloped in a coating of asphaltum, which seems impervious to air and moisture; it is not so hard as to break off, but when pierced seems to close up again like rubber. When sawn, the sap wood has been found filled with the oil, and the heart wood apparently as sound as when treated; spikes seem to hold well, and on being drawn were bright in color and clean.

At the same there were treated at Somerville 100 longleaf and 90 loblolly pine ties, first, with 2 per cent. solution of zinc-chloride, followed by a dipping for twenty-four hours in Beau-

mont crude oil. An average of 3.49 lbs. of oil per tie in the longleaf and 3.15 lbs. per tie in the loblolly was taken up in each case, about 1 lb. to the cu. ft., the ties, in other words, only painted with oil. The longleaf, at the last examination (September, 1909), were all in track, but 10 showed decay, and all the loblolly were also in track, but 11 showed decay. In addition to these, 100 longleaf and 42 loblolly pine ties were dipped for twenty-four hours in Beaumont crude oil, without other treatment, by which the longleaf showed 5.67 lbs. and the loblolly 4.24 increase in weight per tie. Of these 70 longleaf were taken out in 1906 for decay, and at the September (1909) examination only three were found sound and 27 more or less decayed, while of the loblolly 40 were taken out in 1904 and the remaining two since then on account of decay; in other words, they lasted somewhat longer than untreated ties would have done. These cases are mentioned because they have been quoted as instances of ties treated with crude oil giving poor results, whereas they were only painted and could not in any sense be termed treated ties. To make it worse, the loblolly were only partially seasoned when dipped.

A number of untreated white oaks, red oaks and other kinds of ties were placed in the same track, and the result is here given. These were put in for comparison between the life of untreated ties and those of the different treatments, under similar conditions of service, etc.:

Untreated Ties, Laid in Texas Experimental Track, April, 1902, for Comparative Purposes.

196 White oak, 147 removed by 1908, rotten; only 13 sound ties now in track.
 177 Red oak, and ties of that family; all out in 1905-6-7 and 9, for decay.
 49 Tamarack, all out in 1905, decay.
 100 Beech, all out in 1905 and 6, decay.
 101 Hemlock, all out in 1904, decay.
 100 Shortleaf, all out in 1904-5-6 and in 1910 (1), decay.
 100 Loblolly, all out in 1904, decay.
 93 Longleaf, 85 out in 1904 and in 1908, for decay; only 6 left, and these are decayed and will come out soon.

In 1906 the result of the crude oil test was so encouraging as to warrant others on a larger scale, so a number of ties were treated in our experimental plant at Somerville with the Bakersfield oil and 200 were sent to the Tampico Branch of the Mexican Central Railway, where untreated Mexican pine ties would have to be taken out for decay in about 12 months. These were placed in the track in June, 1907, and when I saw them last (February, 1910) they were all in excellent condition, looking fully as well as when laid. The ties sent and the treatment of each is as follows:

	Absorbed average,	Lbs.
100 Texas sawn pine.....	25.6	
40 Texas hewn pine.....	51.0	
10 Texas sawn gum.....	18.7	
10 Texas hewn gum.....	37.5	
10 Texas red oak.....	10.2	
10 Oregon fir.....	4.7	
10 Beech.....	22.7	
5 New Mexico sawn pine.....	24.2	
5 New Mexico sawn pine.....	38.1	

200

It is the intention to make an inspection of these once each year. Of those treated at the same time a number were placed in our own track on the Beaumont Division, which are still there.

EBANO OIL TESTS.

As the distance is too great to bring any large quantity of oil from Bakersfield, and a similar quality is found at Ebano, near Tampico, a carload was imported in 1908 and a number of Texas pine and gum ties were treated in various ways and with different pressures. While this oil is reasonably similar in its analysis to the Bakersfield oil, we were not able to get as good penetration with it. This became more noticeable later on in the experiments on account of having to keep the small quantity of oil at high temperature for each treatment (the lighter oils presumably going over in the meantime). The same heating occurs to a lesser extent, however, in using other oils, and the thickening of the Ebano oil might not be so noticeable when largely used, as the larger supply in the storage tank would be kept at lower temperatures than that in the working tank; it would, however, be hard to handle in long pipe lines. In any event, there does not appear to be much

prospect of getting a supply for general use, as the oil company has placed its entire output for the present, and in its other field the oils are said to be of a lighter gravity.

When it became difficult to handle successfully we tried to reduce the viscosity by mixing it with Texas fuel oil, but the two did not combine. A mixture was then tried of two parts oil and one part creosote, with excellent results, the two assimilating very well, and with this mixture the difference in penetration was clearly apparent. Later on a mixture of three parts Ebano and one of creosote was tried, but the result was not so good, and we had to go back again to the two and one part mixture. To show the difference in the handling of these oils the relative viscosity is here given of each at 200° F., using water as a basis and calling it 100. Beaumont crude oil would be about the same as creosote, being a trifle less viscous than residuum No. 1.

Water	100 (60 F.)
Creosote	100 (200 F.)
Residuum No. 1	82 "
Bakersfield	25 "
Ebano	10 "

There are 463 ties treated with Ebano oil alone, and 160 more with the oil and creosote mixture; marked with special nails, identifying each tie and treatment in the experimental track. It should be several years before anything is heard from them, although they will be inspected from time to time, and as anything worthy of note shows up a report will be made. There seems no reason why Ebano should not be as good for preservative purposes as Bakersfield oil if the viscosity can be reduced somewhat. When it becomes apparent that a regular supply can be obtained at a satisfactory price, we can consider its use on a large scale. The National of Mexico is now using it exclusively in its plant at Aguas Calientes.

The following is a detailed analysis of the three oils made by our chief chemist, which shows that while there is not much difference in the distillation fractions, yet the viscosity tests are widely apart. It follows, therefore, that we can get almost as good penetration with the Residuum No. 1 as with creosote, and a better one with the Bakersfield than with the Ebano:

	field.	Ebano.	Residuum No. 1.
Flashes in closed tester, degrees F.....	256	176	186
Flashed in open tester, degrees F.....	268	190	210
Burns in open tester, degrees F.....	300	230	286
Degree Baume at 60 F.....	11.9	12.1	26.3
Specific gravity at 60 F.....	.9867	.9849	.8959

Distilling tests using retort:	
From 0° C to 100° C, per cent.....	...
From 100° C to 150° C, per cent.....	1.0 Trace.
From 150° C to 500° C, per cent.....	15.0 20.1 24.1
Evaporation tests in open dishes placed in air oven:	
At 140° to 150° F, and oil 1/4-in. deep:	Per cents. evaporated.
In 24 hours.....	2.8 6.8 3.0
In 96 hours.....	4.6 9.4 5.1
At 200° to 210° F, and oil 1 in. deep:	
In 24 hours.....	4.8 9.8 8.3
In 96 hours.....	11.5 11.4 14.0

Viscosity tests using Scott's viscometer in which 200 c.c. oil is put in the viscometer and the number of seconds required to deliver 50 c.c. through a small orifice is recorded. Standard for this machine is 11 seconds for 50 c.c. distilled water at 60° F:

	Seconds per 50 c.c.
Creosote.	Bakersfield.
At 100° F.....	1,565
At 150° F.....	238
At 200° F.....	11.0 44.5 110
At 220° F.....	31.5 70
At 250° F.....	22 40.5 11.5

Viscosity of oils after approximately 10 per cent. was volatilized:

	Seconds per 50 c.c.
Creosote.	Bakersfield.
At 150° F.....	364
At 200° F.....	11.0 104 452
At 220° F.....	60 200
At 250° F.....	34 125

Residuum No. 1 is made from an asphalt base crude oil from which only the illuminating oils are taken off, while other refineries having this same grade of oil, after taking off the lighter ones, generally heat the residuum to a higher temperature in order to get a lubricating oil. In doing so a part of the remaining residuum is converted into free carbon, which prevents its being used for preservative purposes, on account of choking up the wood cells.

CRUDE OIL AT ALBUQUERQUE.

As a result of the 1901 test with Bakersfield crude oil, when the Albuquerque Treating Plant was finished in March, 1908,

we started treating with it by the full cell process, but could not get satisfactory penetration in the case of red spruce. These are the most durable and lasting ties we get in the Rocky Mountain district, and we thought it best to take no chances with a light treatment of crude oil until we knew more of the results from actual use, and since then have been treating them by the Rueping process, leaving in about the same amount of creosote per cu. ft. as in Texas longleaf. We have treated all other hewn and floated sawn ties with crude oil, and they are beginning to make their appearance very generally in the track, being usually recognized by the asphalt coating over the exposed portion of the tie. The sawn pine ties treated with crude oil include a number of those from the Santa Barbara grant, which are floated down the Rio Grande; their soaking a few weeks in the water making an appreciable difference in oil absorption, once the ties are again seasoned.

Other sawn ties, from Arizona, have a variable quantity of sap, and some exposed heart on one or more sides, the sap in many cases being close grained on account of slow growth. As the oil goes very little into the heart wood, it seemed as though we were not getting as deep penetration or treatment as we should, and in some of the ties an additional safeguard was deemed advisable to supplement the crude oil. As a result of tests, it was proven that creosote and this crude oil, although of different specific gravities, would stay perfectly mixed in bulk a sufficiently long time for all practical purposes, so we used a mixed treatment with this class of tie, using 30 per cent. creosote and 70 per cent. crude oil. This has given good results and in addition helps to keep down the temperature of the crude oil, which needs to be heated higher than creosote in order to increase its fluidity for penetrative purposes. Dry heat seems to affect the wood at certain temperatures more than steam heat does at higher ones, and the wood being thoroughly air seasoned prior to treatment, I believe the temperature of the oil used should be less than 200° F., as otherwise the exposed portions of the ties are likely to become brittle and susceptible to rail cutting.

Prior to treatment, the ties at this plant have been sorted over and those which it was believed could be satisfactorily treated with crude oil were handled in that way, while those which could not were given either the mixed treatment or the Rueping, the object being to get the best results in the end.

From March, 1908, to December, 1909, inclusive, we treated at the Albuquerque plant the following ties:

By crude oil treatment.....	801,399 or 85.8 per cent.
By Rueping creosote treatment.....	109,650 " 11.7 "
By mixed.*	23,447 " 2.5 "
Total	934,496

*30 per cent. creosote, 70 per cent. crude oil.

And for the fifteen months ending March, 1910, the average absorption and cost under the various treatments was as follows:

Pine Ties with Crude Oil—Full Cell Process.

Class of tie.	Cu. ft. per tie.	Oil per tie, lbs.	of treatment,	Cost, per cu. ft., cts.	Total cost
					No. 1 hewn.....
No. 2 "	3	48	11¾ "	3.9	" 2 "
" 1 sawn.....	3½	51	12½ "	4.0	" 1 sawn.....
" 2 "	3	36	11½ "	3.8	" 2 "

Red Spruce Ties (With Creosote-Rueping Process).

No. 1 hewn.....	4	18.6	23 cts.	5¾
" 2 hewn.....	3	15.5	18½ "	6.0
" 1 sawn.....	3½	16.8	18 "	5.2

Pine Ties Mixed—30 Per cent. Creosote and 70 Per Cent. Crude Oil—Full Cell Process.

No. 1 sawn.....	3	36	16½ cts.	5.3
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Prices are based on creosote at 8¾ cents per gallon and crude oil at 1½ cents per gallon. The cost per cu. ft. is shown on account of the variable average size of ties in order to give a fair comparison. The cost of No. 2 hewn Rueping ties is a little over the average on account of excess creosote oil left in ties in some of the months.

In the full cell process we fill the cylinder with ties, close doors and admit oil until cylinder is completely filled; adequate pressure is then applied until the necessary absorption is obtained, after which the oil is let out of the cylinder and a

vacuum applied to stop the drip before the ties are drawn out of the cylinder.

In the Rueping process the cylinder is filled with ties, doors closed, and air pressure applied varying with the class of ties, the same pressure being placed on the oil in an elevated tank connected with the impregnating cylinder. Oil is then transferred from the elevated tank to the impregnating cylinder, and when the latter is full, valve is closed and pressure applied to fill the tie with oil. The pressure is then released and oil withdrawn, the air plug in wood cells expanding, which forces surplus creosote out of the cells, a vacuum being applied to aid in this work.

In the mixed process, the creosote and crude oil, both well heated, are put in same tanks and kept thoroughly mixed, especially before commencing treatment, the work then following the full cell process. Our crude oil ties are reasonably clean after treatment, and no complaints are made by the men in handling them.

The quality and viscosity of this oil as compared with the others is shown in the analysis above. We obtained a tank car for testing, and as may be gathered from the analysis report, obtain excellent penetration, practically as good as could be obtained with creosote. It is unfortunate, however, that the supply is small.

The tests were all by the full cell process, with various pressures and times, on about 400 ties, which, except for a few kept out for weighing tests, are in the experimental track properly marked for identification. We also have a second tank car load now at Somerville with which to continue certain other tests.

We do not claim crude oil to be an antiseptic like creosote, its value as a preservative so far as at present known being the extent to which it permanently and effectually fills the wood cells, and prevents moisture entering, in contact with air and heat. To determine to what extent this was the case we took some loblolly and long-leaf air-seasoned pine ties, which in each case were given the usual treatment of the class, and not specially prepared in any way, carefully selected for uniform size, sap wood, etc., so that when cut each piece would be similar as far as possible for purpose of comparison. The following tests were then made:

TO DETERMINE WATER ABSORPTION IMMEDIATELY AFTER TREATMENT.

Hewn ties, air seasoned, cut in pieces, then each weighed and treated with oil as noted; after weighing, each piece was soaked in water for 120 days, then weighed to determine the extent of water absorption through the treatment; the ties treated with crude oil being in each case by the full cell process, and the Rueping with creosote approximating 4.8 lbs. to the cubic foot.

Texas Long Leaf Pine.				
	Oil taken up, lbs.	Per cent, inc. in weight.	Water taken up, lbs.	Per cent, inc. in, weight.
Residuum No. 1.....	8.5	44.7	2.0	7.3
Bakersfield oil.....	7.5	38.5	4.0	14.8
Ebano oil	7.0	60.7	2.5	8.9
Rueping creosote	3.0	14.3	3.0	12.5
Untreated .....	...	...	10.5	51.2
Texas Loblolly Pine.				
Residuum No. 1.....	12.5	62.5	2.0	6.2
Bakersfield oil	15.0	77.0	3.5	10.1
Ebano oil	15.5	77.5	2.0	5.6
Rueping creosote	3.0	14.3	9.5	39.6
Untreated .....	...	...	18.5	86.0

In the Rueping treatment, by coincidence, the pieces of longleaf and loblolly each weighed the same before and after treatment, thus taking the same quantity of oil in each case, but in the soaking the longleaf piece increased only 12½ per cent. in weight as against 39.6 per cent. in the loblolly, due, of course, to the difference in sap wood.

In order to determine the influence the quantity of oil absorbed by the tie had in preventing water penetration afterward, two loblolly air-seasoned ties were cut in four equal pieces, weighed, and then treated with each kind of crude oil, one set being given a *heavy treatment* of oil and the other set a *light one*, weighed and soaked in water as before, and at the end

of the period noted, weighed each one again, with the result here shown:

	Oil absorbed, lbs.	Per cent. gain after treatment,	Soaked weight, No. days.	Gain in weight, lbs.	Per cent. of gain.
Loblolly tie.					
Ebano—Light	15.5	18.7	120	10.5	30.0
Ebano—Heavy	15.5	60.0	120	2.5	5.8
Bakersfield—Light	6.0	18.9	130	13.0	84.4
Bakersfield—Heavy	18.0	47.9	130	3.5	7.3
Residuum, No. 1—Light	6.0	14.6	133	6.0	12.8
Residuum, No. 1—Heavy	15.5	44.2	133	5.0	9.9

In order to determine the effect of time and evaporation in proving the value of each oil as a means of keeping air and moisture out of the timber, one longleaf and one loblolly pine tie, each well air seasoned, was cut into five pieces and treated as shown, then air dried for 168 days, after which they were soaked in water for 112 days, then taken out, weighed and put back again for a period, making the entire soaking one year and twenty-four days:

Longleaf Pine.									
Initial weight, lbs.	Oil absorbed, lbs.	Loss of weight by treating, p. ct.		Gain in weight by soaking, 112 days, 1 yr. 24 d's.		Gain in weight by soaking, 112 days, 1 yr. 24 d's.		112 days, 1 yr. 24 d's, p. ct.	112 days, 1 yr. 24 d's, p. ct.
		wgt. 168 days	wgt. 168 days	112 days, 1 yr. 24 d's, p. ct.	112 days, 1 yr. 24 d's, p. ct.	112 days, 1 yr. 24 d's, p. ct.	112 days, 1 yr. 24 d's, p. ct.		
Rup. Creo.	24.5	2.5	10.2	1.5	5.6	4.5	17.6	7.5	29.4
Full cell:									
No. 1 Res.	27.5	8.0	29.1	1.0	2.8	2.5	7.2	3.5	10.2
Ebano	22.0	3.0	13.3	..	..	3.0	12.0	5.5	22.0
Bkfd.	25.0	5.5	22.0	..	..	3.0	9.8	5.0	16.4
Untreated	23.0	..	..	..	..	7.0	30.5	9.5	41.3
Loblolly Pine.									
Rup. Creo.	19.0	4.5	23.7	0.5	0.2	8.0	34.8	11.0	47.8
Full cell:									
No. 1 Res.	21.0	11.0	52.4	1.5	4.7	3.0	9.8	4.5	14.8
Ebano	19.5	17.5	89.7	3.0	8.1	3.5	10.3	6.0	17.6
Bkfd.	20.0	14.5	72.5	0.5	0.1	3.0	10.3	5.5	16.2
Untreated	30.5	..	..	..	..	5.5	18.0	8.0	26.2

It must be admitted that these tests were extremely severe and under conditions not to be found in ordinary service, yet the three crude oils show up remarkably well. The Rueping being a "cell wall" treatment, it must be expected that the evaporation and absorption of water would be heavier than where the wood cells were filled.

The second test proves the advisability, so far as we know at present, of using a heavy treatment to fill or close the wood cells as far as possible. It may, of course, turn out that a "cell wall" process, leaving at the same time an ample supply of oil in the wood, will prevent decay to an equal extent with a "cell wall" creosote treatment, but this has yet to be proven and I think it would be unwise to do more than test the matter at this time, then watch developments. The Mexican Central a year or so ago, as a result of our experience, abandoned the Wellhouse process and started treatment with Ebano crude oil. For a short time they used a Rueping treatment with about 6 lbs. to the cu. ft., but since then have dropped this and are now using the full cell, with an absorption approximating our own.

We expect to continue our experiments with these crude oils mixed with different proportions of creosote, giving a heavy cell wall treatment, try more air and soaking tests and also treat some ties by the "cell wall" process with crude oil only and put them in the track alongside the others, also place some of them in a fungus pit, to judge by the results. I should be slow in advocating the adoption of any light crude oil treatment until conclusive proof is obtained of its value, the difference in the cost of a light and a heavy absorption, as compared with the value of the tie in the track, being too small to run any risk.

In the third test there is evidently an error in the initial weight of the loblolly Rueping piece, as it would certainly lose more in the seasoning than is shown. There may also be a slight error in the Ebano, as 3 lbs. is more than might be expected, with other experiences of this oil in mind. In every case the loss by evaporation of these asphalt base oils has been small, this feature adding to their value for our purposes, as it materially helps in preventing the entrance into the wood of what otherwise might start decay. The gain in weight in the 112 day soaking period was practically alike with each crude oil, and even with the thirteen month test in the loblolly tie there is not an excessive difference. In the longleaf, No. 1 Residuum shows up the best, followed by the Bakersfield.

Some time ago we gave an order for some Oregon pine creosoted ties to the Creosoting Company at Seattle, the con-

tract requiring them to show an average actual penetration of creosote, five-eights of an inch deep on the four sides, midway between ends. They were for testing purposes and, as it must be remembered, these ties are all heartwood, a penetration equal to that obtained in sap ties could not be expected, and further, that under the rail base where the wear and spiking comes, the depth of oil would be greater by reason of penetration from the ends. When in Seattle a month ago I suggested to the treating company that they get some Bakersfield crude oil and try a mixture such as we use at Albuquerque, say one of creosote to three of crude oil, in order to reduce the cost and viscosity, and increase the penetration. They since write me they have had excellent success with their tests and have already gotten an increased penetration, so that I hope they will soon be able to guarantee us an inch between the ends, which is as much as one could expect with these ties, and the cost of such a treatment with creosote alone would be too great for ties with cut spikes.

So far as our experience at present goes, this mixture is economical as against the Rueping (cell wall), where the price of creosote is high and crude oil low, taking the quantity absorbed and the character of the timber into consideration. It will be all right on the Pacific Coast, or in New Mexico, but not in Texas until it has been proven that a full cell treatment is not necessary, and I am not ready now to suggest an adulteration of our creosote under the Ruebing method. We expect still to continue our tests, but no change will be recommended until we are sure of our conclusions. If the Ruebing gives us the life claimed for it we will have received good value for its cost.

The tests with Residuum No. 1 and Ebano showed an average absorption with the full cell process on loblolly ties of:

Residuum No. 1.....	56.1 lbs. per tie = 7½ gallons.
Ebano	40.2 lbs. per tie = 5 gallons.

After the success with Residuum No. 1, which, although almost as fluid as water, yet remained in the wood and stood all other tests equally as well, if not better than the others, we made a number of tests with ordinary Beaumont fuel oil and some with another residuum, called No. 2. The thorough mixture of these with creosote for a time much beyond our extreme period of treatment was complete, several analyses made before treatment, in the middle of it and at the end showing no perceptible difference over possible errors in the making. Their analysis, as compared with Residuum No. 1, considered a first class oil for our use and with creosote which we know all about, is as follows:

	German creosote, Sp. gravity at 15° C.....	Residuum No. 1, Up to 210° C., per cent.....	Residuum No. 2, Up to 210° C., per cent.....	Beaumont oil, Sp. gravity at 15° C.....
Up to 210° C., per cent.....	1,071	0.889	0.885	0.891
210 to 235° C.....	4.9	0.0	6.2	4.3
235 to 315° C.....	23.3	0.0	6.2	5.5
Residue	51.0	6.5	29.1	35.2
Total	21.2	93.5	58.1	55.1

We have a number of ties treated with each of the last two oils mixed, some three to one, and some two to one, of creosote, and it might be expected that, being as liquid as water, the penetration was complete. The cost, however, of using them this way by the full cell process is out of the question until we have had more experience in the result obtained in service, the three of Beaumont oil to one of creosote costing 50 per cent. more than for the Ruebing treatment on same class of ties.

The average absorption of the mixed treatment with Beaumont crude oil was as follows:

Loblolly pine, average per tie, full cell process.....	66 lbs.
Shortleaf " " " " "	49 "
Longleaf " " " " "	38 "

Cost, therefore, of treating (oil only) with one part creosote and three parts Beaumont crude, in mixture, as compared with crude oil alone would be:

	With the mixture, Lbs. cost in cents.	With crude oil alone, Lbs. cost in cents.
Loblolly	66 29.3	66 19.8
Shortleaf	49 21.9	49 14.7
Longleaf	38 17.0	38 11.4

Our Texas pine ties (3.1 cu. ft.) average, of Loblolly 60 per cent., Shortleaf 28 per cent. and Longleaf 12 per cent., and our Rueping average creosote treatment for pine ties, 1909, was

16.07 lbs. to the tie, therefore the cost and comparison of the two treatments would be:

Rueping for oil and royalty.....	15.1 cents
Mixed treatment, as above.....	23.8 "
Beaumont oil alone, as above	17.4 "

Above cost is based on creosote 8.8 lbs. to gallon at 7 1/4 cents and crude oil 7 1/2 lbs. to gallon at 2 1/4 cents. Of course, the first is only a "cell wall" treatment, while the others fill the tie entirely so that all moisture, etc., is kept out, but the actual value of each in the track has yet to be determined.

After laying the ties treated with this mixture in the sun for five months to determine any loss in weight from evaporation, the result was surprising and compares very favorably with the other oils so far considered much its superior. The Beaumont oil is generally termed a light oil and subject to heavy loss by evaporation, yet the loss in using it in a mixture of two to one was only 1.93 lbs. per tie, or 4 per cent.; with three to one 2.8 lbs. per tie, or 5 per cent.; and with Residuum No. 2 (two to one) 2.3 lbs. per tie, or 4 per cent. We expect to make a number of further tests with these oils, at same time using the fungus pit to get an idea of the relative protection in each case, and while this must not always be taken as conclusive, yet it furnishes some indication of what we may expect in the track after years of service and exposure, allowing, of course, for certain conditions not found in either case.

When we started issuing crude oil ties the superintendents and roadmasters were quite nervous about fire risk, but it is never mentioned now and the records show no greater loss by fire than before. In my opinion, there is less danger with crude oil than with creosote, and with this latter it has been proven that once the tie becomes well dried out, the untreated wood will burn easier and quicker. In the crude oil used there is usually so little illuminating oil it quickly goes off, probably in the heating, and leaves only the asphalt base. I recently learned that one of our superintendents made a test to satisfy himself on this point when he first began receiving crude oil ties, by having a mountain freight engine's fires cleaned where there were some crude oil, creosoted and untreated ties lying alongside each other in the track; the result was that the crude oil ties were only scorched, the creosoted ones to a heavier extent, while the untreated ones would have been destroyed had the men not put out the fire.

Shortly after the crude oil ties went into use we had complaints about their rail cutting and not holding spikes. It must be expected that if ties completely filled with oil are laid in the track as soon as they come out of the plant, there will be some trouble of this kind, just the same as though the tie was soaked with water. If the treating is properly done, the temperatures kept within reasonable bounds and the ties not put into use until after they are seasoned, there should be no cause for criticism. All that we ask is that the treatment be given a fair show.

In some tests made on our crude oil ties by the government engineers, they claimed a heavy difference in compression against the grain, as compared with untreated wood, but on investigation I learned that in order to get the thick Ebano oil into the wood towards the close of the treatment and before we reduced the viscosity by mixing it with creosote, our Somerville people treated these test ties under a temperature of 210°F. for some hours, which, in the case of seasoned wood and of soft pines, is too high for good work, as at Albuquerque we do not use over 192°F. Even with full cell creosote treatment, a reduction in strength is noted. Further tests will be made with crude oil ties treated at the usual temperatures, and those in the track watched for results as compared with other treatments generally used.

TIE SPACER.

BY F. B. TAPLEY,

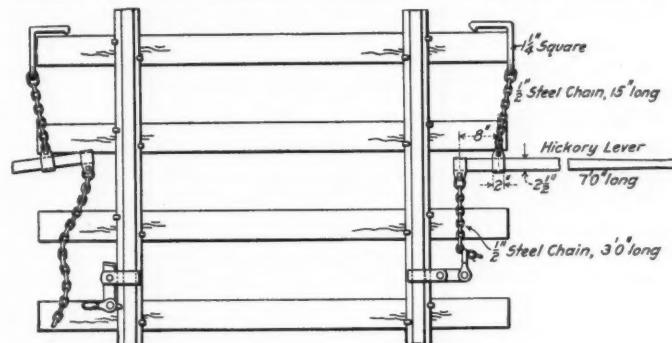
Resident Engineer, Canadian Pacific, District No. 1, Atlantic Division.

In relaying rail on maintenance of way work it is often necessary to respace the ties at the joints and shoulders, especially where rails of light section in 30-ft. lengths are being replaced by heavier ones in 33-ft. lengths, and particularly in localities

where rails have a tendency to creep. Where creeping occurs to any marked degree the ties are generally pretty well skewed to the track. The usual method in resspacing ties is to use lining bars, digging the ballast out in front of the ties and shoving them forward with the bar.

This method is not only slow and expensive but has the disadvantage of leaving the ties slack in the ballast, so that low spots in the surface occur and make rough riding track. It is often necessary to go over track two or three times, where the ties have been spaced in this manner, tamping up and resurfacing before a solid roadbed and smooth riding track is obtained.

To overcome this one of the roadmasters on this division, J. A. Miller, worked out and built the tie spacer illustrated herewith. The drawing shows the spacer set up on the rails. The clamp is fitted over the head of the rail, the jaw grasping the web as the chains are tightened. The hooks are placed in the tie to be spaced and the chains set up taut in the grab-hooks. Two men are put on each lever and the tie is pulled along the bottom of the rail flange and spaced to the required distance.



Miller Tie Spacer.

It is sometimes necessary, when the ties are badly bunched, to dig out one tie in each rail length to start the machine, but under ordinary conditions it is not necessary to do so. This machine not only pulls the tie along the bottom of the tie without disturbing the solid ballast underneath, but it lifts it about $\frac{1}{8}$ in., leaving the track a trifle high to be put down to place by the first train and making resurfacing unnecessary.

The drawing shows the rail clamp built to work on top of the rail. It can be built to work on the bottom, but this is not so handy and requires longer chains, making the machine more burdensome to move. This machine is an inexpensive one to build and is a great time saver. It requires four men and a foreman to run it.

Where the gravel is not too coarse or where cinder ballast is used the machine is an efficient worker. Where gravel containing large stones is met with the spacer does not work so well, as these large stones have a tendency to make the ties cant or roll over when being spaced. The machine has never been tried in broken stone ballast, and it is doubtful if it would work satisfactorily in such ballast.

CLEARANCES AND GRADE SEPARATION.*

BY W. H. BREITHAUPT,
Member Canadian Society Civil Engineers.

The physical laws for grade separation are two:

1. The structure carrying the upper line of traffic must be sufficiently high above the lower traffic way to clear all objects passing on the latter.
2. The grade on either traffic way, approaching the crossing, must be practicable for the traffic thereon.

The maximum height of loaded vehicles and any objects thereon on city streets or country highways has been accepted as 14 ft. This height is also sufficient to clear regular street rail-

*From a paper read before the Canadian Society of Civil Engineers in March, 1910.

†Official Railway Equipment Register

way traffic. While higher objects are moved along roads occasionally, it is properly not considered necessary to endanger the practicability of crossings under railways to accommodate them.

The vertical clearance, top of rail to bridge, required over railway tracks is in most cases much higher than over roads, and this constitutes, in the great majority of cases, the insurmountable obstacle to grade separation. There are, at the present time, on the railways of standard gage in the United States, Canada and Mexico†, about 2,377,282 freight cars of all kinds. They classify as to height, rail to running board, as follows:

Under 12 ft., including flat, gondola and tank cars..	63.1 per cent.
12 ft. to 18 ft.	23.4 "
18 ft. to 18 ft. 6 in., inclusive.	11.9 "
18 ft. 6 in. to 14 ft.	0.65 "
Over 14 ft.	0.95 "

Of the total number of freight cars 98.4 per cent. are 13½ ft. high or under, and only 1.6 per cent. are higher than 13½ ft.; and less than 1 per cent. higher than 14 ft.

Considering the largest lines, the Pennsylvania Railroad, the Baltimore & Ohio, the Erie, the Lehigh Valley, the Great Northern, and a number of others, i.e., as far as known, with a small percentage of cars having dimensions not ascertained, among the latter the Grand Trunk and the Canadian Pacific, have either none or less than one-quarter of 1 per cent. of freight cars over 13½ ft. to running board.

The Master Car Builders' Association has not fixed a standard for box car dimensions, but adopted in 1904, as recommended practice, a height of 12 ft. ¼ in. to eaves, equivalent to less than 13 ft. height to running board. High standard cars are such as the Grand Trunk Pacific Series 300000—310824, 13 ft. 4 in., and the Canadian Pacific new steel frame box car Series 130000—132998, 13 ft. 4¾ in. The highest regular Canadian Pacific freight cars are 13 ft. 6 in. to running board, and this may be said of most of the main trunk lines of railways. The highest Pennsylvania Railroad freight cars are 13 ft. 4 in.

Limits of car dimensions are fixed by clearance outlines on the various railways. A composite clearance limit diagram for ninety railways,* including all Canadian trunk lines, has a height of 14 ft. 6 in., limiting "over all" height of cars to this figure and practically limiting height of top of running board of freight cars to 14 ft. In the St. Clair tunnel of the Grand Trunk the clearance height at width of 3 ft. is 14 ft. It is true that on many divisions or branches of the lines considered the clearance is somewhat greater than shown in the composite diagram referred to, while on the other hand, it is less on a number of main lines and on many branch lines.

An empty freight car 14 ft. high on a 5 ft. transverse base (out to out of rails) will not resist a 30-lb. wind pressure when standing alone.

The limit of grade, approaching crossings, can for railways be taken as between 0.5 of 1 per cent and 1 per cent. For city streets a grade of 5 per cent. is in most cases extreme and it should be so for main country highways. A preferable maximum grade for roads is 4 per cent., and 3 per cent. is materially better. This works out as follows:

Five per cent. grade $20 \times 2 = 40$ ft. length of approaches for every vertical foot of clearance.

Four per cent. grade $25 \times 2 = 50$ ft. length of approaches for every vertical foot of clearance.

Three per cent. grade $33 \text{ ft. } 4 \text{ in. } \times 2 = 66 \text{ ft. } 8 \text{ in.}$ length of approaches for every vertical foot of clearance.

Any gain, by curtailment of vertical clearance requirement, or by change of railway grade, or by both, means corresponding shortening of road approaches at the high ends. Such a gain of 1 ft. may greatly reduce the cost of a given grade separation, making it practicable when it would not otherwise be so. A vertical gain of 2 ft. would mean a very large addition to the number of practicable grade separations.

The extreme allowance that should be made for brakemen on a car must not exceed 7 ft.; 6 ft. 6 in. will clear any brakeman unless he should be over 6 ft. tall, and 6-ft. brakemen are not

common, to say the least. What is to be said for the contention, seriously made, that the brakeman on the running board of highest known car should be allowed room to swing his lantern over his head? The necessity for brakemen on the tops of cars is becoming less and less, and has in many cases disappeared, rules and regulations of railway companies to the contrary notwithstanding. The air brake is now universally used in main control trunk line railways in the older parts of the United States.

The Pennsylvania Railroad makes it a rule to avoid all grade crossings on new work, and has within the last nine or ten years eliminated over 50 per cent. of all its grade crossings on main lines. To do this clearance must be made as low as possible. Overhead bridges are as low as 16 ft. 6 in. above top of rail, while many are 18 ft. 6 in. and less. Twenty-one ft., the standard for signal bridges, is recognized as the highest clearance for which there can be any need. In New York state many overhead bridges are only 18 ft. above the top of rail, and this is the case also in Massachusetts and in other states. The New York Central & Hudson River has asked for 16 ft. or 16½ ft. clearance for all overhead bridges within the electric zone, extending 16 miles from the Grand Central Station in the city of New York.

It is submitted that with conditions as they are and more so with regard to the future, 20 ft. (13½ ft. for car and 6½ ft. for man) is a reasonable vertical clearance. It has been shown that 13½ ft. covers the height to running board of all but a very small percentage of freight cars now in use, and that cars higher than 14 ft. to running board, i.e., higher than 14 ft. 6 in. "over all," or to top of brake rod, can only to a limited extent traverse beyond their home railways. That higher cars will be economical or practicable is as little probable as that the gage of railways will be widened or their entire structure changed. For a vertical clearance requirement greater than 21 ft. (14 ft. plus 7 ft.) there can, in any event, be no conceivable rational need.

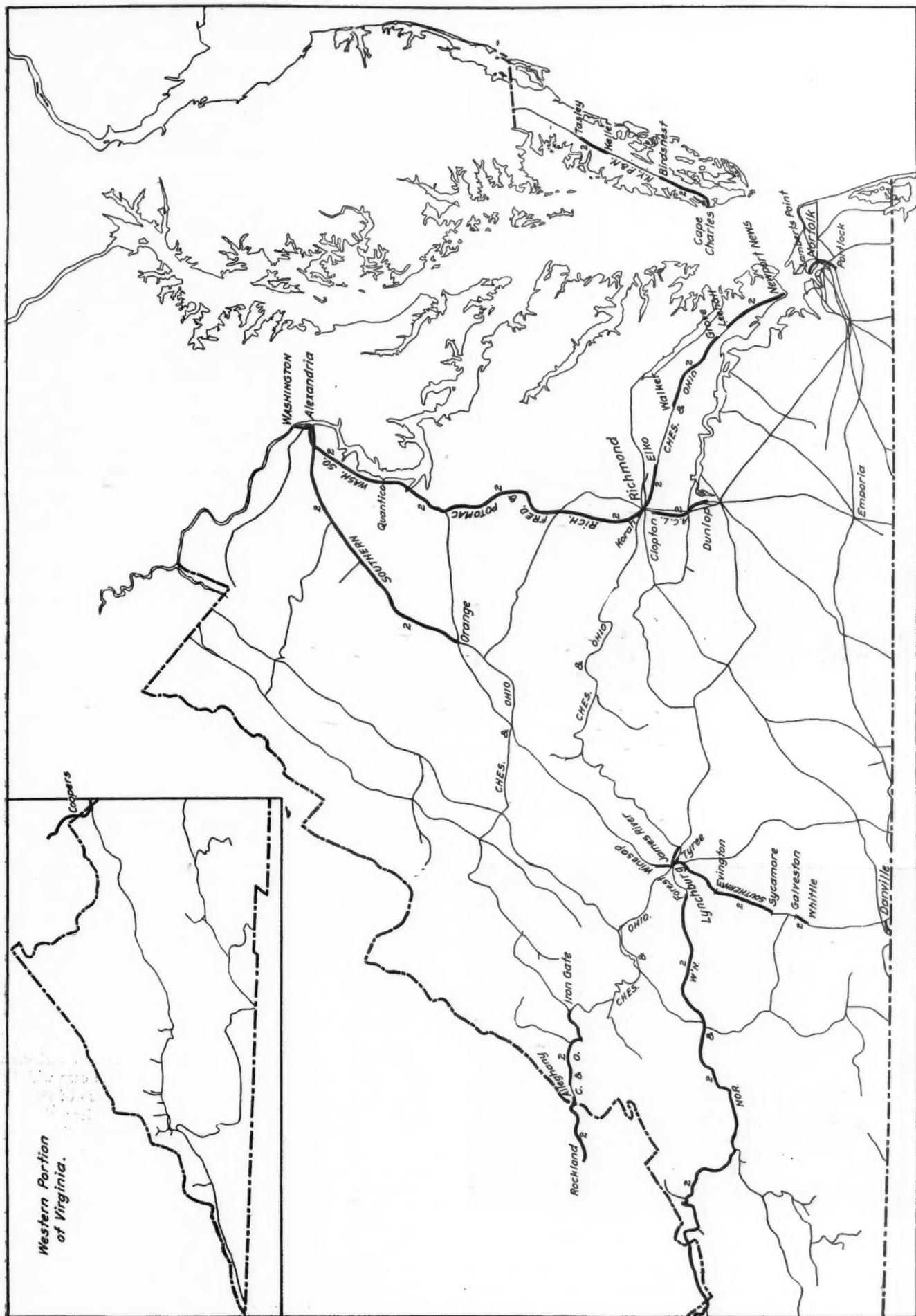
In the United States there is no federal law fixing vertical clearance for bridges over railways. A number of states deal with the question. In Massachusetts there is a special grade crossing commission. The minimum clearance required by this commission is, in general, 18 ft. Connecticut and Rhode Island also specify 18 ft. In New York the Public Service Commission has charge of grade crossing regulations. While this commission requires 21 ft. clearance where practicable, many lower bridges are built throughout the state; some, as already stated, are as low as 16½ ft. New Hampshire, Ohio and Indiana require 21 ft. The only states requiring more are Illinois and Vermont, where 22 ft. is specified, but exception is made where this height is not practicable. In all other states there is no statute or regulation, as far as has been ascertained, and heights of overhead bridges vary from 16 or 18 ft. to 22 ft.

In Canada the Dominion Railway Act of 1904 specifies a minimum clearance of 22 ft. 6 in. above rail level (allowed to mean base of rail) for bridges over railways, with no deviation except by leave of the Board of Railway Commissioners; and this board has hitherto not allowed a deviation in any case.

DOUBLE TRACK RAILWAYS IN VIRGINIA.

The map given herewith shows all railways in the state of Virginia on which there are two or more main tracks. The termini of the sections having more than one track are as follows:

VIRGINIA.	No. tracks.	Approx. miles.
<i>Atlantic Coast Line.</i>		
Clopton to Dunlop	2	16
Chesapeake & Ohio.		
Newport News to Lee Hall	2	18
Grove to Walker	2	23
Elko to Korah	2	18
Tyree to Southern Railway crossing	2	2
Iron Gate to Lewis tunnel	2	32
Allegheny to Rockland, W. Va.	2	20
<i>Norfolk & Western.</i>		
Lambert's Point to Portlock	2	20
James River bridge to Lynchburg	2	5
Forest to Coopers, W. Va.	2	160
<i>Richmond, Fredericksburg & Potomac.</i>		
Quantico to Richmond	2	79



Double Track Railways in Virginia.

	No. tracks.	Approx. miles.
<i>Southern.</i>		
Alexandria to Orange	2	78
Lynchburg to Evington	2	17
Danville to Pelham, N. C.	2	9
Winesap to Sycamore	2	39
Galveston to Whittle,	2	2
<i>Washington Southern.</i>		
Washington to Quantico	2	34
<i>New York, Philadelphia & Norfolk.</i>		
Tasley to Keller	2	8
Bird's Nest to Cape Charles	2	16

A MACHINE SHOP ON WHEELS.

The North Coast Railroad, which is being built in Washington, is using a traveling machine shop car for making repairs to locomotives and other equipment, until such time as a permanent shop can be located and erected. Exterior and interior views



Machine Car; North Coast Railroad.

of the car are shown in the accompanying illustrations. The machine tool equipment consists of a 23-in. engine lathe, 16-in. shaper, 1½-in. bolt cutter, 16-in. pipe threading machine, 22-in. vertical drill and an emery wheel. The inside dimensions of the



Interior of North Coast Machine Car.

car are: Length, 39 ft. 10 in.; width, 9 ft. 6 in.; height, 9 ft. Power is furnished by a 12-h.p. FairbanksMorse vertical gasoline engine, air cooled. This engine also drives the car, being connected by a friction clutch and sprockets and chain to one of the

axles. The car does all necessary switching and travels along the line at 8 to 10 miles an hour. The engine has been in daily use for nine months with no expense for repairs. It consumed 4 gals. of gasoline in a 12½-hr. run, with two men working in the car and using such of the tools as they required on the work they were doing.

VANADIUM IN CAST IRON LOCOMOTIVE CYLINDERS.*

BY GEORGE L. NORRIS.

Vanadium is probably the most powerful metal for alloying with steel. One or two-tenths of 1 per cent. raises the elastic limit of mild carbon steel about 50 per cent., or more in some cases, without impairing the ductility. Vanadium steels have a very high dynamic strength, sustaining repeated vibrations better than any other steels. The greatest application of vanadium will doubtless continue to be in combination with steel, as here all its wonderful effects and qualities can be fully developed.

Cast iron may be regarded as a more or less impure steel, containing, in addition to the usual elements present in steel, a comparatively large quantity of carbon in the form of graphite interspersed throughout its structure in the form of granules, flecks or flakes. The graphite destroys the continuity of the metal. In consequence the limit of strength of cast iron is low as compared with steel, and it also follows that any improvement conferred upon cast iron by an alloy must necessarily not be as great as in the case of more homogeneous steel. In cast iron, also, we have a metal that is subjected to no work or heat treatment to develop latent qualities.

Nevertheless the benefits which accrue from the incorporation of small percentages of vanadium with cast iron, especially in chill and cylinder castings, are very great, even if they are not so spectacular in their nature as those obtained in steel. Vanadium not only cleanses the cast iron from oxides and nitrides, but also exercises a very strong fining effect on the grain of the iron, with the result that porosity is eliminated and sound castings are produced. Strength, resistance to wear and rigidity are all increased by the addition of vanadium to gray cast iron, while the vanadium martensites are much tougher than ordinary martensites. In the case of chilled cast iron, vanadium produces a deeper, stronger chill, and one less liable to spall or flake.

As a result of two years' test on a pair of cast iron cylinders made of vanadium cast iron, the New York Central specified vanadium cast iron for the cylinders of 183 new locomotives built during the past eight months. The pair of cylinders under test gave upward of 200,000 miles, with only microscopical wear, whereas ordinary locomotive cylinders will show about $\frac{3}{16}$ in. wear per 100,000 miles. These locomotives were built by the American Locomotive Company and comparative tests have been made between the iron containing vanadium and that to which no vanadium was added. The averages of 10 consecutive comparative tests are as follows:

	Strength
Plain cast iron	Transverse 2,130 lbs. Tensile 24,225 lbs.
Vanadium cast iron	2,318 lbs. 28,728 lbs.

The transverse tests were made on 1-in. square bars, 12 in. between supports; the bars were machined all over and consequently were absolutely comparable, as is not the case with bars tested as they are cast. The tensile tests were also of machined bars. In machining the vanadium cast iron cylinders, the effect of the vanadium was noticed in the machining qualities of the iron; the chips were not so short, were tougher and showed considerable springiness. The use of vanadium in cast iron will doubtless find its greatest field in engine cylinders, both gas and steam, where it will be of great value in increasing the life of the cylinder through its effect on the wearing qualities of the iron.

Tests of vanadium in malleable cast iron have been reported as satisfactory in every way, the fiber of the iron showing

*From a paper read at the May meeting of the New England Foundrymen's Association, at Hartford, Conn. Mr. Norris represents the American Vanadium Company, Pittsburgh, Pa.

much cleaner and the tensile strength being improved about 12 per cent. The castings were also very much stiffer than ordinary malleable castings.

Method of Adding Vanadium.—In applying vanadium to cast iron, it must be remembered that nothing like the heat of molten steel is at hand; consequently one should use a finely crushed or powdered alloy of a low melting point. As the melting point depends directly upon the percentage of vanadium contained in the alloy, a ferro-vanadium containing under 35 per cent. vanadium should be used. If the iron to be vanadized is melted in the air furnace, the procedure is a very simple one: After the charge is melted and 15 to 20 minutes before tapping, the ferro-vanadium is added and the bath well stirred or rabbled.

Where the iron is melted in the cupola it is necessary to add the vanadium to the ladle, and, as the amount of heat available for dissolving the ferro-vanadium is limited, the iron should be tapped out as hot as possible and a ladle used that has just been emptied in order to conserve as much heat as is practicable. After the bottom of the ladle is covered with a few inches of iron, the finely crushed or powdered ferro-vanadium is added by sprinkling it on the stream of iron as it flows down the spout to the ladle. In this way advantage is taken of all the available heat, and there is also the mixing effect of the stream as it strikes the iron in the ladle. After the vanadium is added the contents of the ladle should be well rabbled and allowed to stand a few moments before pouring in order to insure thorough incorporation and complete reaction.

In the case of cupola iron, with its limited available heat, it has been found that the addition of 0.10 to 0.12 per cent. vanadium is all that should be attempted ordinarily; while in the case of high grade air furnace iron, with its reserve of available furnace heat, the addition of 0.18 per cent. to 0.20 per cent. is advisable and readily made.

The analyses of a great many tests show that about 70 to 80 per cent. of the vanadium alloys with the iron, the remainder being used up in cleansing the iron from oxides and nitrides. In remelting cast iron which has been vanadized, most of the vanadium is necessarily lost, owing to the very strong oxidizing conditions under which the iron is melted. The effect, however, of the small amount of vanadium remaining in the remelted iron is apparent in the texture of the grain and its consequent freedom from porosity.

TRAIN ACCIDENTS IN JULY*

Following is a list of the most notable train accidents that occurred on the railways of the United States in the month of July, 1910. This record is intended to include usually only those accidents which result in fatal injury to a passenger or an employee or which are of special interest to operating officers. It is based on accounts published in local daily newspapers, except in the case of accidents of such magnitude that it seems proper to write to the railway manager for details or for confirmation:

Derailments.					
Date.	Road.	Place.	Cause of derlmt.	Kind of train.	No. persons reported
†1.	Wabash.	Montgomery City, truck.	Pass.	1	4
1.	At., Top. & S. F.	Cedar Pt., Kan.	ms.	Pass.	2
4.	Seaboard Air L.	Marietta.	cow.	Pass.	2
6.	Gulf, C. & S. F.	Somerville.	unx.	Ft.	1
6.	Boston & Albany.	Coltsville.	d. switch.	Pass.	1
7.	Tenn. Central.	Algood.	rock.	Ft.	2
8.	Chic., R. I. & Pac.	Adona, Ark.	d. rail.	Pass.	0
11.	N. Y. Central.	Newton Hook.	acc. obst.	Pass.	3
11.	Seaboard Air L.	Thomas, Ga.	slide.	Ft.	2
12.	Southern Pacific.	Metz, Cal.	unx.	Pass.	1
12.	Southern.	Princeton, Ind.	sand.	Pass.	12
12.	Northern Pacific.	Belmore, Wash.	b. rail.	Pass.	0
13.	Pennsylvania	E. Palestine.	unx.	Pass.	5
17.	Pennsylvania	Watts	d. track.	Ft.	2

*Abbreviations and marks used in Accident List:
rc, Rear collision—bc. Butting collision—xc, other collisions—b, Broken—d, Defective—unf, Unforeseen obstruction—unx, unexplained—derail, Open derailing switch—ms, Misplaced switch—acc. obst., Accidental obstruction—malice, Malicious obstruction of track, etc.—boiler, Explosion of locomotive on road—fire, Cars burned while running—P. or Pass., Passenger train—F. or Ft., Freight train (including empty engines, work trains, etc.)—Asterisk, Wreck wholly or partly destroyed by fire—Dagger, One or more passengers killed.

Derailments.					
Date.	Road.	Place.	Cause of derlmt.	Kind of train.	No. persons reported
18.	L. H. & St. L.	Hawesville, Ky.	slide.	Pass.	1 3
20.	Southern Pacific	Ogden.	acc. obst.	Ft.	4 6
24.	Central Vermont	Willimantic.	ms.	Ft.	0 1
31.	Ch. & West. Car.	Woodlawn, S.C.	fire.	Pass.	2 16
31.	Balt. & Ohio	Easton, Ohio.	slide.	Pass.	1 1

Collisions.					
Date.	Road.	Place.	Kind of	Train.	No. persons reported
†4.	Cin., Ham. & D.	Middletown, O.	bc.	P. & Ft.	23 37
20.	N. Y. C. & St. L.	Chicago.	xc.	P. & Ft.	1 1
21.	Grand R. & Ind.	Portland, Ind.	xc.	P. & Ft.	2 0
22.	Cin., Ham. & D.	Peast Town.	bc.	P. & Ft.	0 12

The butting collision at Middletown, Ohio, on the 4th was between a south-bound passenger train of the Cleveland, Cincinnati, Chicago & St. Louis and a north-bound freight of the Cincinnati, Hamilton & Dayton; and 22 passengers and one trainman were killed, and 35 passengers and three trainmen were injured. The passenger train was running over the line of the C. H. & D. because of a blockade on its own road, and was in charge of a pilot. The freight train was preparing to enter a side track and had nearly or quite stopped, but the passenger train was running at 50 miles an hour or faster; and the engines and first two or three cars in both trains were completely wrecked. The leading car in the passenger train was crushed by coming in contact with a steel gondola car of the freight, while the next passenger car was crushed by heavy timbers, which had constituted the load of the second car in the freight train. The original order issued for the meeting of these two trains required the passenger train to wait for the freight at Poasttown, three miles north of Middletown, but later this order was annulled or modified, and the passenger train was allowed to pass Poasttown some minutes ahead of the time to which it had been required to wait, but this modification was not delivered to the freight. It is said that the order (the one first issued) gave the freight until 1.07 to reach Poasttown, whereas the collision at, or near, Middletown occurred at 1.03. The despatcher was dismissed. According to the newspapers he neglected to send the second order first to the freight.

The derailment at Newton Hook, N. Y., on the 11th, occurred about 3 a.m., a fast northbound express train running over a car door, which, evidently, had fallen from a car in a southbound freight.

The derailment at Woodlawn, S. C., on the 31st, was due to a burning trestle bridge on which passenger train No. 2 ran without warning. The engineman and the fireman were killed. The injuries to the passengers were mostly slight. According to the press despatches, the conductor and the baggageman saw the smoke from the burning bridge when they were still a mile distant, and they applied the brakes. Why they did not succeed in stopping the train is not explained. The engine broke through the bridge and, with the tender and baggage car, fell to the creek below. The wreck took fire and was quickly burned up.

The derailment of the 20th occurred on the trestle across Great Salt Lake. A large rock fell from a car in a gravel train, derailing several cars and precipitating many workmen into the lake.

Of the 13 accidents on electric railways reported in the newspapers as occurring in the United States in the month of July, two were attended with fatal results: a derailment in Brooklyn, N. Y., on the 8th, in which one person was killed and 18 injured, and a butting collision near Ortonville, Mich., on the 12th, in which one person was killed and 45 were injured, six of the latter being reported as fatally injured. In this case a work train collided with a passenger car. It is said that the men in charge of the work train, ordered to wait on a side track for three special cars, went out after the passage of the second car, and collided with the third. A third accident in this list was that on the monorail line in New York City, on the 17th, in which about 20 persons were injured. This accident has already been reported.

A disastrous derailment occurred in Russia, July 31, and a collision in Ireland on the 19th. The derailment was at Kisilarwat,

on the Transcasian Railway, killing 19 and injuring 31. The collision was on the Great Southern Railway, at Roscrea, in the northwestern part of Tipperary County. An excursion train broke away from the locomotive and ran back down a grade into the head of a following passenger train—an accident apparently quite similar to that at Armagh, Ireland, in 1889, when 80 passengers were killed and 262 injured. In the present case 100 passengers were injured, but most of the injuries were slight. Many persons jumped from the runaway cars and tumbled down a bank. At Winnipeg, Man., July 8, a locomotive ran into a street car on a crossing, killing three persons and injuring many. The engineman said that the flagman had given him the signal to go ahead, and the flagman was arrested.

MISSION BAY VIADUCT; SOUTHERN PACIFIC.

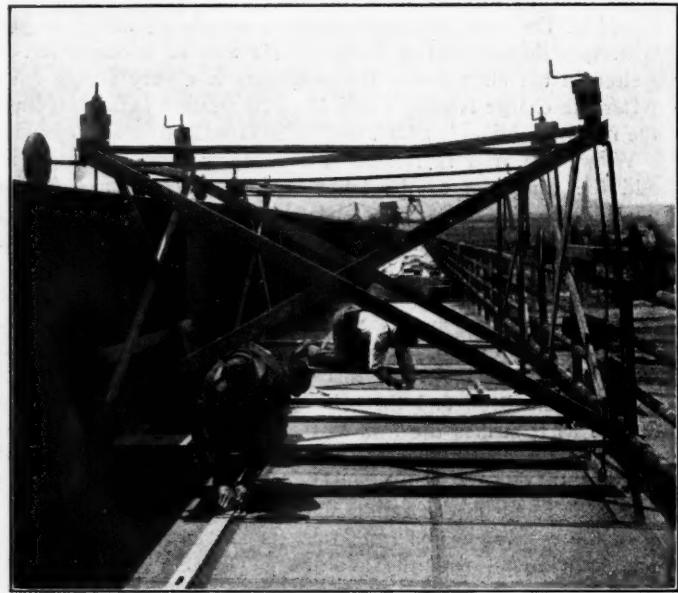
The recently completed Mission Bay viaduct of the Southern Pacific in San Francisco, Cal., has a total length, including approaches, of 3,680 ft. and contains 5,300,000 lbs. of steel.

The viaduct is of the through-plate girder type, the girders on the main portion being 10 ft. $\frac{1}{2}$ in. high with 36-ft. roadway between and a 10-ft. sidewalk on the property sides. The tops of the girders are about 6 ft. above the level of the roadway, thus forming an efficient protection for the traffic on the street side and to pedestrians on the sidewalks. The main girders vary in length from 36 ft. to 88 ft. The photographs show the method used for erecting short girders by a traveling derrick on a completed portion of the viaduct; the erection of a long girder by using the derrick on the viaduct and another on a car on the underneath tracks, and the erection of a column between yard tracks.

Floor beams are built up, and stringers throughout the structure are rolled I-sections. The average depth of floor beams from back to back of angles is 3 ft., the stringers varying in depth from 15 in. to 24 in. The roadway and sidewalks are of concrete reinforced with corrugated bars, the roadway reinforcement consisting of $\frac{5}{8}$ -in. bars, continuous top and bottom. On the roadway is a 2-in. sand cushion under a basalt block pavement. Roadway slabs are designed for Cooper's Class A highway loading and the sidewalks for 10 lbs. per. sq. ft. live load.

The construction of the roadway floor and the traveler used for placing the concrete is shown in the photograph of the reinforced concrete floor construction.

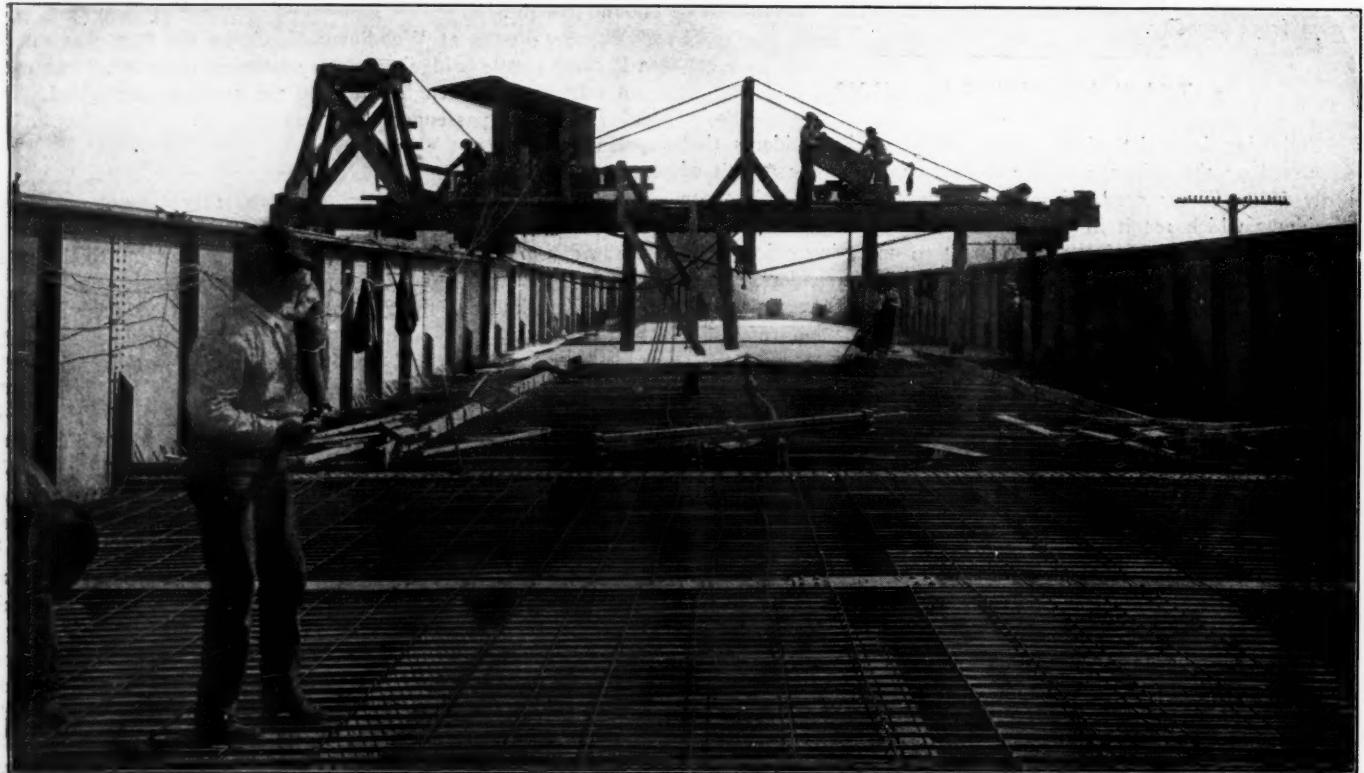
Difficulty is always experienced in finishing large areas of concrete sidewalk because of the necessity of keeping men off the fresh work. How this was avoided in the sidewalks of this viaduct is shown by the photograph of the traveler that enables the finishers to do their part of the work in a comfortable and satis-



Lining Surface of Sidewalk.

factory manner. Concrete abutments of U type filled with earth are used on those portions of the approaches which intersect with street grades. The remaining portions of the approaches are of the regular stringer and floor beam construction supported by a three-column bent at intervals of 25 ft.

We are indebted to William Hood, chief engineer of the Southern Pacific, for the description of this viaduct and the photographs illustrating the construction work.



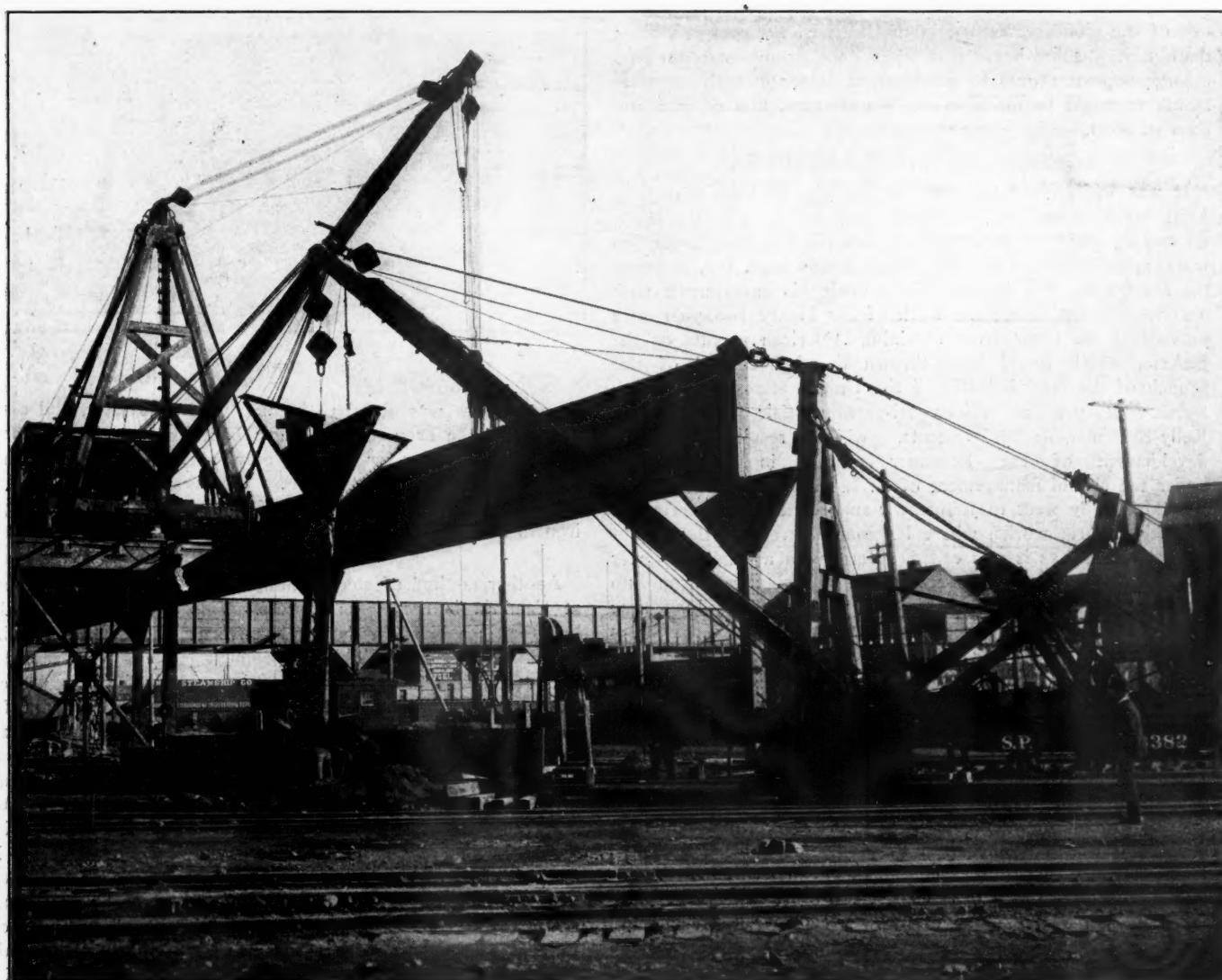
Construction of Reinforced Concrete Floor.



Erection of 88-Ft. Girders.



Erection of 60-Ft. Girders Across Tracks with Freight Train Passing.



Erection of a Column Between Yard Tracks.

THE CAMBRIA STEEL WORKS.

The Cambria Steel Works holds a unique position in the history of the iron and steel industry. It is the oldest steel works in the United States which has mined and worked its own fuel and ore from the beginning of its operations. It has grown so slowly and steadily to its present immense proportions from the most insignificant of beginnings and without any startling events to mark its history, that its development has hardly attracted attention.

The local manufacture dates back about a century to a charcoal blast furnace built in 1808, on Shade creek, and a forge below the mouth of Shade creek, built in 1811. A forge built at Johnstown in 1809 was operated to 1822. The Cambria furnace, in the Laurel Run, was built in 1841, and with other local blast furnaces, all charcoal, became part of the Cambria Works, built in 1853, at which date the rolling mill was commenced and four coke blast furnaces were started. These furnaces all used the local ore, a carbonate of iron and with lime sufficient to make it self-fluxing. This made a hard white phosphoric pig and when put into the heads of rails gave the Cambria iron rails output a high repute.

The completion of the Pennsylvania State Canal & Railroad through Johnstown in 1834 gave the transportation, and the occurrence of this iron carbonate ore and coking coal at Johnstown gave birth to the Cambria Works. The Pennsylvania Railroad, built in 1854, gave additional outlet and market for the rail product.

It was a long story of financial and metallurgical vicissitudes, the upbuilding of this concern, and involves the whole of the development of the iron industry of the United States. As one of the pioneers, located in the heart of the coal producing district, it was inevitable that when once firmly established on a large scale it should be a prominent factor in such improvements as might be made in the manufacture, first of iron and then of steel.

DEVELOPMENT OF THE BESSEMER PROCESS.

It was while chief engineer at Cambria, in 1858, that John Fritz invented and built the three high rolling mill, the introduction of which he so graphically described at the banquet on his eightieth birthday in 1902. And it was here, too, at about the same time, that William Kelly made his experiments with a converter, antedating the work of Sir Henry Bessemer with preventing the latter from obtaining American patents on the process, which would have thrown the full control of this branch of the steel industry of the United States into English hands. It was a curious tri-partite affair that, of the Kelly-Bessemer-Musket patents, which resulted in the development of the Bessemer process in this country under the skilful management of A. L. Holley. It was in 1857 that Mr. Kelly went to Johnstown and started his experiments at the Cambria works, where he finally developed the "pneumatic" process, as it was called. Here, with a small converter of 1,000 lbs. capacity, he succeeded in blowing cast iron into an almost pure wrought iron. He worked for a long time without making any attempt to protect himself by United States patents, and it was only when he learned that Bessemer was about to make such an application that he stepped in and blocked the way.

Meanwhile in England Bessemer had carried his experiments on along the same line, and had reached the same results. He could blow down to a comparatively pure iron, but did not produce a steel. Then Robert F. Musket "took out a patent for his process of adding to melted cast iron, which had been decarbonized and desiliconized by a pneumatic blast, a melted triple compound of iron, carbon and manganese, of which compound spiegeleisen was the cheapest and most convenient form. The addition of from one to five per cent. of this compound to the cast iron mentioned at once overcame the obstacle which had been fatal to the success of Bessemer's invention. Besse-

mer had decarbonized and desiliconized melted cast iron, but had not been able to retain or restore the small quantity of carbon that was necessary to produce steel and in the oxygen of his powerful blast had given to the contents of his converter an element that prevented the production of even good iron. Musket's invention regulated the supply of carbon and eliminated the oxygen."

The situation, then, in this country, would have lain between Kelly and Musket had it not been that Bessemer had brought the machinery of the converter and the application of the blast to a high state of perfection. The result was that no one of the three could do anything without the co-operation of the other two. A combination of all interests was, therefore, effected by the formation of the Pneumatic Steel Association, wherein Daniel J. Morrell, general manager of the Cambria Iron Works, held a three-tenths interest in trust for the Kelly Process Co. From this it will be seen how closely these works were identified with the inception and development of what is known as the Bessemer process.

The English Bessemer process was at first conducted by melting the pig in a reverberatory furnace preparatory to the conversion, but the English soon learned to take metal directly from the blast furnace. The Americans melted the pig in cupolas and mixed it in a large iron ladle to secure uniformity of iron. The



Kelly Converter.

direct process was discussed but not used until later, and some works, like the Troy and the Edgar Thomson, were built without blast furnaces near by. It was only when large blast furnace plants were built that the direct process was introduced and finally perfected by the addition of a mixing reservoir to supply iron to the converters.

COFFIN PROCESS.

Another method of steel treatment which has been developed at Cambria is the Coffin process. This is farther down the line than the blast furnace and converter and deals only with the finished or nearly finished products.

The company is very proud of its record of Coffin process axles. This process has been in use at the Cambria plant for about 20 years, and all axles produced by this company are treated by the Coffin toughening process, whether so specified or not. The company is a pioneer in heat-treated axles, and firmly believes in the necessity of thoroughly annealing forgings after they come from the hammer. The justification of this opinion lies in the fact that it has had reports of only 20 failures of its car axles in as many years. Eight of these were on one road, and were due to improper design, the wheel fit being $\frac{1}{2}$ inch under the M.C.B. standard dimension. The road having these failures admitted that this was the cause of the trouble, as the axles when chemically analyzed and tested showed a very high

standard of product. The axles are made as follows: After making a liberal discard from the ingot at the open hearth department, which insures freedom from piping and undue segregation, the bloom is taken to the axle department, charged in a long continuous furnace, the charging end of which is at a very low temperature, the blooms being pushed by hydraulic pressure to the drawing end of the furnace. The heating is thus very gradual, insuring a thoroughly uniform heat throughout the billet, and in this way preventing many strains which would otherwise result in hammering a billet which was not uniformly heated, as is usually the case when blooms are thrown direct into a high temperature. After coming from the hammer the axle is permitted to entirely cool, and is then again heated in a smaller continuous furnace, in which the same care is exercised to get uniformity, and after passing recalescent or critical temperature in the steel, thus eliminating any possible strains which may have been introduced in the forging process, it is treated to the Coffin toughening process, which gives a remarkable increase in elastic properties and makes the steel very ductile, the elongation being increased to a very marked degree.

RESOURCES OF THE COMPANY.

So much for the past work at the Cambria and some of the results obtained. At present the plant stands as an exemplification of the impossibility of making steel on a small scale. It shows how essential a large plant and large resources are to successful competition in the markets of the world under modern conditions. To meet these requirements the company owns its own mines and quarries, and is sufficient unto itself, from mining its own coal and ore to turning out steel cars and bridges.

ORE RESOURCES.

The ore used in the furnaces at Johnstown is mined in northern Michigan and in Minnesota. In the latter State it owns the well-known Mahoning mine on the Mesabe range, considered to be one of the best developed mines in the world when regarded from an engineering standpoint. The mine is an open one and the ore is a soft brown hematite that can be moved by steam shovel, and is thus loaded direct on the cars by which it is hauled to the shipping point. The second property is the Vulcan, on the Menominee range, whose point of shipment is Escanaba, on Lake Superior. This is also a red hematite. The third is the Republic mine on the Marquette range in northern Michigan. It is a specular ore and is shipped from Marquette, Mich. The total annual output of these three properties is 2,200,000 tons, distributed as follows: Mahoning, 1,500,000 tons; Vulcan, 500,000 tons, and Republic, 200,000 tons.

The ore is handled by lake vessels from the point of shipment to Cleveland or Ashtabula, with some small shipments to Erie and Conneaut. For this traffic the company owns a fleet of five vessels, whose tonnage ranges from 8,000 to 12,500. They are of the type used almost exclusively on the Great Lakes for coal and ore. The engines are set well aft, and the whole deck from the engine and cabin forward to the forecastle is furnished with hatches that can be removed for rapid loading and unloading.

From the port of entry the ore is hauled to the works and there unloaded by a car dumping machine, and again handled and stacked by a traveling gantry. From the stock pile it is brought back to special bin cars that are run into the charging house, where they take the place of the usual bins and discharge into hoppers that empty into the loading skips, which are hoisted to the charging door at the top of the furnace.

The reason for using these Lake Superior ores rather than those found in the hills in the immediate neighborhood of Johnstown is that the latter are not only poorly adapted to steel making, because of their high sulphur and phosphorus contents, but because of the low percentage of iron which they contain, the thinness of the seam, and the consequent expense of mining. These are spathic ores, however, containing so much carbonate of lime that they are self-fluxing. The iron content in the ore is but 30 per cent., necessitating roasting before charging into the furnace. In the early days this was done, the iron content being

raised to 40 per cent. or more. In contrast to this, the Lake Superior ores have an iron content of from 50 to 65 per cent., and require no roasting, besides existing in such quantities that economical mining is possible.

COAL RESOURCES.

The coal used is, for the most part, from the company's mines, which are located in Fayette, Cambria, Blair and Bedford counties, in addition to which it owns some gas coal property in Westmoreland county. The coal belongs to the lower productive measures, and the mines are mostly self-draining. In analysis it runs about 18 per cent. volatile matter, 70 per cent. fixed carbon and 12 per cent. ash. It is all washed before using, and the ash is thus reduced to about 9.5 per cent. While the coal can be coked in the beehive oven, it does not lend itself readily to this method of treatment. Far better results are obtained from the by-product ovens. Accordingly, all of the coke used in the furnaces and elsewhere about the plant is made in the Otto-Hoffmann ovens, of which there are 372 installed. These ovens take a charge of 5.13 gross tons of coal and make about 3.8 gross tons of coke. The by-products are tar, ammoniacal liquor and sulphate of ammonia. The coke produced is exceedingly hard, an excellent burden bearer and a good melter, though requiring a somewhat higher blast than the Connellsburg coke. This is from 12 to 18 lbs. per square inch in the furnaces in use, of which there are eight, running from 85 ft. to 96 ft. high and from 18 ft. to 21 ft. in diameter at the bosh.

The total output of the Johnstown mines, all of which is consumed by the company, is about 132,000 gross tons per month, from which, in addition to the direct coal consumption, 47,000 tons of coke are made.

LIMESTONE.

The company owns its own limestone quarries in Blair and Mifflin counties, which yield an excellent stone. There are four properties in all.

BLAST FURNACE PRACTICE.

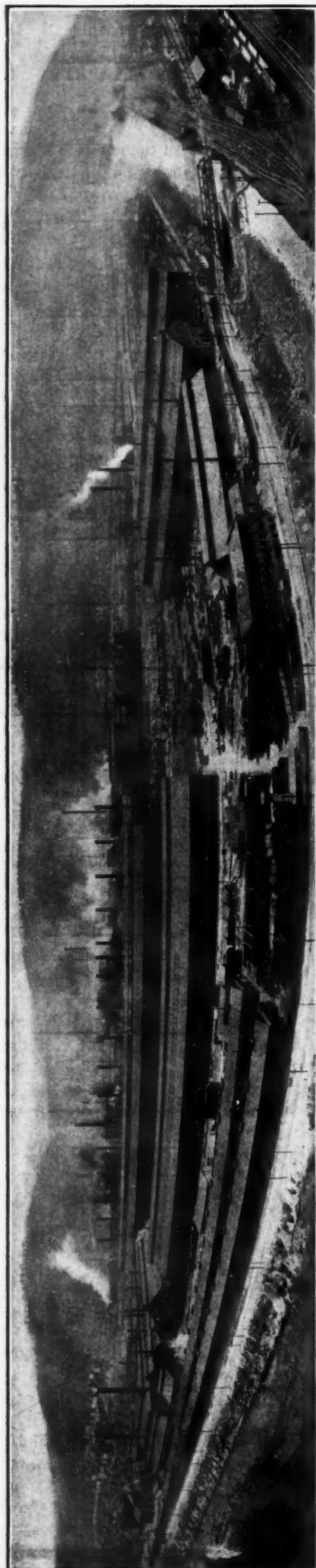
The blast furnace practice does not differ essentially from that elsewhere. The ratio of coke to ore is about as one to two, and the quality of metal produced is low phosphorus Bessemer, or medium phosphorus basic.

The furnaces are equipped with the latest appliances for handling the output. The major portion is taken by a hot metal route to the Bessemer converters, or open hearth furnaces, while that which is cast into pigs is run into a casting machine that receives the metal which, after being cooled by a submergence in a tank of water, is dropped into a bin for storage or directly into dump cars for transportation. There is thus no casting floor similar to that in use with the old style furnaces, and there is no hand manipulation of the metal at all. The total daily output of the eight furnaces in pig and hot metal delivered to the converters is about 3,000 tons.

One familiar blot on the landscape of the usual blast furnace, that is conspicuous by its absence from the Cambria works, is the slag pile. Instead of proving a nuisance and a bugbear to the management the slag from all of the furnaces is converted into a by-product that is a source of profit. After tapping the furnace the slag is drawn off and discharged into the traveling hoppers of a conveyor. These are in the form of shallow pans, which catch the molten slag and carry it out beneath showers of water. This sudden cooling breaks the material into fine pieces, and it is discharged in this condition from the end of the conveyor into cars to be carried away and used in concrete or as railway ballast. So well adapted is it for the purpose that the total output is taken in this way, and, even then, there is not enough made to supply the demand, and what was once worse than a waste has now become a source of revenue.

Six of these furnaces are at what is known as the Cambria and two at the Franklin plant. The total capacity is about 90,000 gross tons per month.

The Bessemer converters are at the Cambria works and are



Franklin Department.



Gautier Department.



Cambria Department.

four in number with a capacity of about 15 tons each, and giving an average monthly output of about 60,000 tons.

THE PLANTS.

There are three distinct plants at Johnstown, all inter-related and, to an extent, interdependent and yet entirely separated in their departmental management. The old or Cambria plant, known as the lower mills, is situated at the lower end of the town, while the Franklin plant is at the upper end, three miles from the former. It is between these two that the hot metal route is established. Between them, but nearer the Franklin plant, is the Gautier plant. There are rolling mills in all three plants, but each is devoted to a different class output. There are no open hearth furnaces at Gautier, but there are at each of the other plants. At the Franklin works there are 17 furnaces of 50 tons capacity each. At the Cambria works there are eight open hearth furnaces, four of 50 tons and four of 25 tons capacity each. Ingots weighing as much as 24,000 lbs. are cast at the Franklin works, while at the Cambria works the ingots are lighter, usually running about 6,000 lbs. The heavy slabbing and blooming mills, as well as the plate mill, are at the Franklin works and the heavy blooms are rolled there. The rail mill is at Cambria, as well as the mills for structural shapes; the billets for the lighter work at the Gautier plant are also made here and at Franklin.

There is nothing about the general work of either of these plants that differentiates them from other steel works, except for occasional details of practice that are always of interest and value, but which are too numerous to be considered in an article of this kind.

MISCELLANEOUS WORK AT GAUTIER WORKS.

For miscellaneous items and for a class of work that is not only unusual in itself, but quite at variance from the general conception of that done by the Cambria Steel Co., we must turn to the Gautier works. They are located at the upper end of the city of Johnstown proper and between the other two plants. Here a multiplicity of articles are made and a degree of fine rolling attained that puts it in the realm of the arts. The Gautier mills have established a reputation for a high standard of quality and of accuracy of rolling, so those wanting more delicately drawn or rolled shapes apply to Johnstown. The output of the Gautier mills, consisting of these high-class specialties, agricultural implement and merchant bar steels, amounts to between 20,000 and 30,000 tons per month. For the most part the billets and bars from which this work is made are rolled at the lower or Cambria mills, while the plates come from the Franklin plant. The stock is reheated at Gautier and rolled, pressed or drawn into shape. Here the various forms of tire rims for automobile wheels are rolled; sections whose several parts must fit into each other with an accuracy that would only be attainable in machine tool work at great expense, and whose multiplicity of forms cover not only the wheel rims but the whole wide range of this class of work. Then there are hundreds of small sections rolled for almost every conceivable use, where the variations from standard dimensions are limited to the thousandth of an inch. There is also a wide range of product for agricultural machinery. The output in harrow discs, for example, is about 3,000,000 pieces per year and the stamped and pressed seats for harrows, rakes, mowing machines and harvesters rises to 300,000 pieces, and these are but two of the specialties produced. In addition to these there are finger plates for mowing machines that are cold rolled to great accuracy, the fingers for tedders, cultivators and hay rakes, to which may be added a long list of other minor parts that to catalogue would be to list all of the principal detail features of agricultural machinery.

There is a department of rod and bar work that closely resembles wire drawing in its methods and rivals it in the accuracy of its products. Round, square, hexagonal and other shapes of bars are rolled at the Cambria mills to within $\frac{1}{32}$ in.

of the desired finished dimensions and are then taken to Gautier where they are drawn through dies, exactly like wire, to dimensions that must not vary more than one-thousandth of an inch from the standard dimensions, and where they are given the usual polished surface of wire drawing. Shafting is also manufactured in large quantities. The regular cold rolling process has been abandoned and in its stead the shafting is turned to approximate size, possibly one-thousandth of an inch large and is then polished by cold rolling down to size. These rolls are set at an angle with the axis of the shaft and draw it in exactly the same manner that the roller is used on the journal of an axle to polish and finish its surface.

Accustomed as most engineers are to associate Cambria with rails and structural shapes, with perhaps a faint idea that merchant bar is also a part of its output, forgetting or ignorant of the existence of its mines, its fleet of lake vessels and its blast furnaces, this refinement at the other end of the line is a matter regarding which almost complete ignorance prevails. The shapes and forms produced in these mills are not exploited or advertised, because they are made for some individual consumer, who takes this, for him, raw material and puts it into his own marketable output. So there are many who, wanting some delicately drawn or rolled shape, whose weight would be measured in ounces to the yard, would not apply to Johnstown to have it made, because the place is associated with heavy rails and beams. And yet, minute as much of this work is, and so light that hoists and cranes are not needed to handle it, its quantity is so great that the finished output of these little things at the Gautier plant amounts to between 20,000 and 30,000 tons a month.

CAR DEPARTMENT.

Although much of the output of the Cambria and Franklin plants, aside from that of the Gautier, is, though finished, in the form of the rough materials of rails and the heavier shapes, much of it is worked up into other forms ready for use. It is here that the structural and car departments step in as consumers for a goodly portion of the output of the rolling mills. They are both located within the domain of the Franklin plant and are equipped with every appliance for the economical and rapid handling of the work.

In the car department the axles, truck frames and car bodies, even to the bolts and rivets, are made from the works' own output. At present, with the forces working day and night, forty-five cars of 50 tons capacity each are made every 24 hours. If we place the weight of these cars at 39,000 lbs. each, the material consumption accounted for is 858 tons a day, which, with the wastage, would raise it to well over 900 tons.

There is the machinery used in the formation of the pressed steel parts of the cars, overhead cranes for handling the heavy parts, and riveters of the gap or hammer type for driving the rivets. The method pursued is to assemble the details, such as sills and bolsters, and rivet them with pneumatic gap riveters. Then when these are brought together they are first bolted and then riveted with the pneumatic hammer. The punching is done to a large extent with automatic machines, which serve to greatly cheapen the cost of duplicated work. After assembling, and before riveting is commenced, a precaution is taken against the straining action of excessive drifting, by reaming out each hole, so that there is a positive certainty of the easy driving of each individual rivet. This practice holds for all parts, whether of bolsters, sills, upper framing or plates. The result is that there is no delay in the riveting and the work is prosecuted with great despatch.

The general method is to rivet sills and bolsters, riveting them in an underframe, after which the superstructure is built on. All of this work is done on horses under cover, while the trucks are being assembled at one end of the shop. At the end of the day when the bodies have been completed, the trucks are lined up on a track outside. A traveling crane then picks up a body at a time and sets it on the trucks. The car is then run down to another shed for the application of the air brakes and for painting.

STRUCTURAL DEPARTMENT.

The structural department is operated along lines of equal simplicity. Punching of sheets and shapes is done on the automatic machines and the assembling is effected as in the case of the cars, the riveting being done only after the holes have been reamed.

IMPROVEMENTS UNDER WAY.

If we were to read back into the story of the plant, it would be one of steady and continuous growth from its first inception in the late thirties of the last century. So, judging from the past and from present appearances, it seems probable that the growth is to be a continuous one for some time to come. Two things of importance are now being pushed to completion. One is the construction of a 66-in. pipe line 14 miles long, to bring water to the works from a reservoir of 11,000,000,000 gals. capacity, that is being built at Quemahoning creek. This is necessitated by the scantiness of the present supply.

The second improvement is the addition of two Morgan semi-continuous bar mills to the Gautier plant to meet the increased demands for Cambria steel bar products.

The third important addition is a first-class wire plant. Prior to the great flood of 1889, at which time the wire mill was completely destroyed, the Cambria Iron Company was one of the most important manufacturers of wire in the country. This re-entrance into the wire market simply carries out a long-cherished plan, the consummation of which had been deferred until ample provision for the supply of steel necessary for the production of wire could be made.

OUTPUT.

This, then, is an outline of the work done by the Cambria Steel Co., and a brief sketch of the part it has played in the development of the steel industry of the United States; an industry that receives from these works alone an output of 250,000 tons of rails; 250,000 tons of shapes; 150,000 tons of plates; 300,000 tons manufactured into cars, and from 200,000 to 250,000 tons of miscellaneous material, based on an output of 1,375,000 tons of blooms, slabs and billets, with an ingot production of 1,608,000 tons. An output that necessitates the employment of about 20,000 men.

Surely this is an example of self-sufficiency that rivals even the isolated family of olden days. Taking the coal and iron from its mines, hundreds of miles apart, it brings them together, and by the manipulation of the magic of modern metallurgy, it sends out complete and ready for use the structural shapes of the modern building and the fully equipped car to carry them to their destination.

HOSPITAL FOR EMPLOYEES.

But its sole interest is not in the tonnage of steel that it can turn out, regardless of the safety and lives of the great army of workers that it must marshall to its aid in order to achieve these results. Happily there is a bright humanitarian side to its work that is deserving of the closest attention and imitation. From the time that the miner disappears from the light of day with his pick, until the completed car is drawn from the yard ready for service every step of every process that intervenes is fraught with danger to life and limb, some of which is very great. A slight distraction of the attention, an inadvertent step or motion may result in the loss of a life or a limb. Despite the safeguards that are thrown about the men, and the protection with which the machinery and furnaces are surrounded, accidents will occur. Realizing that the commonest sentiments of humanity demanded some means of relieving the suffering that resulted from these mishaps, the Cambria Steel Co. was the first to organize an industrial hospital for the systematic and immediate care of those of its employees who should suffer injury from accidental causes, either while going to, returning from, or at work.

No expense has been spared in the equipment, and no feature of scientific treatment and relief has been overlooked, until the little hospital on the hill back of Johnstown stands as a model

to be studied and copied, while its own work, if appearances are any indication of the truth, serves as a constant inspiration to its nurses and doctors and to the officials who are responsible for its existence and maintenance.

It ranks, we believe, as the first industrial hospital to be established by any steel works in this country for the care of its own disabled men. It was founded in 1881, when it was decided that it would be far better in every way for the company to care, and to care properly, for the men who were hurt than to trust them to the chances they must run if turned over to a public hospital or such surgeons as they might themselves engage. For many years it had been the custom to have the company's surgeon attend them at their own homes, but the difficulty of obtaining sanitary conditions and proper nursing or the execution of the doctor's orders, showed the necessity for a regularly organized hospital.

Two years after building the hospital, or twenty-seven years ago, a relief association was formed which has been in continuous and successful existence ever since. It was intended to take care of workmen disabled by injury or sickness, and the scope of this society has recently been enlarged to provide a pension for employees over 70 years of age, or those permanently disabled by accident. This association also manages the hospital service.

The monthly payments range per man from 90 cents to \$1.15 to the benefit fund and 10 cents for pension fund. The benefits are \$5 per week for accident or sickness, \$100 burial fee, and with various payments for loss of life, limb or sight, up to \$1,000. These payments are guaranteed by the Cambria company, which gives gratuitously the office and clerical services and \$1 per member yearly. Up to date the association has paid \$2,539,000 for deaths and benefits. This is the earliest beneficial organization founded in this country by a steel corporation and its employees.

The hospital had ten beds when first established, but this has been increased to 50 beds, with an operating room equipped with the latest appliances for scientific surgery. In connection with the hospital, there are emergency boxes scattered all over the works, with appliances for first aid to the injured. In each department there is a man trained in the use of this emergency apparatus and who is held responsible for its proper maintenance and the condition of the patient when he reaches the hospital. About once every three months these men are brought together to listen to a lecture by one of the hospital staff and witness demonstrations of the methods to be pursued in the care of the injured. The result is that the infection of wounds cared for in this way is down to less than 1 per cent. of those injured.

In connection with the emergency work, there are two ambulances stationed at the Cambria and Franklin works that answer calls at once in the regular manner. At present they are hauled by horses, but an automobile ambulance is to be established at the Franklin works to lessen the time required for the delivery of a patient to the hospital. Supplementing the ambulance service there is a buggy service for men who have suffered minor injuries and are able to sit up. The patient is at the hospital within half an hour of the time of injury, except for accidents in the mines, when the time is, of course, longer.

The magnitude of the work is greater than would be supposed. For example, in the dispensary more than 40,000 dressings are made a year. The new cases for dispensary work run from 20 to 30 a day. For the current year it is expected that there will be more than 1,000 admissions to the hospital. Last year there were 250 cases of fracture and between 200 and 300 operations performed. This indicates the importance of the work and it is difficult to understand why the example set at Johnstown is not followed elsewhere.

This, then, shows in skeleton outline the main features of the Cambria steel works; the wide range of its products, the completeness of its organization, and the self-sufficiency, and how, through it all, there is an anxious care for those of its employees who may have been injured while in its service.

General News Section.

The Atchison, Topeka & Santa Fe intends to convert all passenger locomotives running between Kansas City, Mo., and Newton, Kan., to oil burners.

Telephones are now being used for sending train orders on the line of the New York, Chicago & St. Louis between Bellevue and Conneaut, Ohio, 132 miles.

On Wednesday of this week a young Spaniard named Moisant flew across the channel from France to England, carrying in his aeroplane one passenger.

A press despatch from Washington says that the commissioner of corporations will soon publish a report on terminals of water transportation routes in the United States.

The International Railway Congress, which has just closed its eighth session at Berne, Switzerland, has voted to hold its next meeting, which will come in 1915, at Berlin.

A committee of which C. J. McNitt, general auditor of the Oregon Short Line, is chairman, is making plans for the organization of a railway club at Salt Lake City, Utah.

The El Paso Southwestern is preparing in El Paso, at an expense of \$10,000, a club house for its employees. The club rooms are in the building formerly occupied by the general offices.

The Grand Trunk Pacific is now running a train regularly to and from Edson, Alberta, 146 miles west of Edmonton, which has been the terminus for the past year. From coal mines on the Brazeau river, south of Edson, the company expects to get 5,000 tons of coal daily.

The government has begun suit in the federal court at Jackson, Miss., against the Gulf & Ship Island to recover \$2,500 in penalties for violation of the law regulating the hours of service of telegraphers. The suit is said to be an outcome of a recent strike of operators on the road.

The governor of Montana has asked the railways to co-operate with the state and federal officers in supplying men to fight the forest fires. He expressly said that such assistance would not be taken as an admission of negligence by railways in starting fires. It is said that 125,000 acres have been burned over.

The Delaware, Lackawanna & Western has enlarged its force of policemen and has been making numerous arrests of tramps. On its Western division, robberies from freight cars have become serious during the past year, and the company has decided that it can no longer depend wholly on the local police authorities for protection.

In New York City, August 11, there was a conference between Chairman Knapp, of the Interstate Commerce Commission, and Chief Commissioner Mabee, of Canada, concerning the proposition, broached by Canada some months ago, to establish some kind of joint governmental control over traffic between Canada and the United States.

The Western Pacific has announced that it will begin running regular through passenger trains on August 22. There will be two trains each way daily. Westbound, they will leave Salt Lake at 1:45 p.m. and at 10:30 p.m. Eastbound, they will leave San Francisco at 9 p.m. and 7 a.m. The distance of 921 miles will be covered in about 33½ hours.

A Railroad Men's Picnic will be given at Freeport, Ill., on September 8 for the benefit of a home for aged and disabled railway men. Ex-President Roosevelt is expected to make an address and the railways will make a round trip rate of \$1.50 from all points within 75 miles from which the usual round trip fare exceeds \$1.50. The picnic will take place on the fair grounds and the county fair will be going on at the time.

The Illinois Central has been asked to establish a suburban passenger station at Monroe street, Chicago, and the citizens most interested say that the company has practically decided to grant their request. It is claimed that dwellers in the office buildings, banks and hotels near the proposed location, to the

number of 12,000 daily, will use the Illinois Central trains if they have the opportunity. These applicants estimate that a satisfactory station can be put up for \$75,000.

The Missouri railway commission has issued a notice to the railways that it will prosecute roads violating the state hours of labor law by requiring employees to return to their posts of duty before the periods of rest prescribed by the act have expired. The Missouri law provides that employees shall have eight, or ten, consecutive hours of rest, according to the kind of service in which they are engaged. The commission finds that some roads have been requiring employees whose hours of rest expired at, say, 9 o'clock a.m., to report for duty 30 minutes earlier than this, and the attorney-general of the state has given an opinion that this is in violation of the law.

The strike of track repair men on the Delaware & Hudson, which began July 2, has been settled at a conference of representatives of the road, the strikers and the New York State Bureau of Mediation and Arbitration. The company has agreed to pay the laborers \$57.50 a month and the foremen \$75. No payments will be made for overtime and no deductions for a single day's absence for good reasons. The disturbances along the line of the road since the strike was begun have been so annoying that the company recently offered a reward of \$1,000 for the arrest of any person tampering with the company's property. Trains have been delayed and the rails of the tracks have been loosened at Carbondale, Cork Lane, Forest City and other places. At Schenectady on August 11 eight Italian track laborers were arrested on charges of train wrecking, and it is stated that four of the men confessed to having had a hand in the derailment of a passenger train near Ballston July 31.

The state assessment board of South Dakota has this year made no increase in the assessment of railway lines in the state, one reason for this being that a suit is pending in the United States court, in which one of the vital points is the state physical valuation of the roads, and until this is settled, the board did not feel like making any changes. For a similar reason, the valuations of express companies operating in the state were given a substantial increase. The board used the reports of the express companies to the railway companies as a basis of assessment last year, declining to accept the reports of the companies, which showed only such business as was entirely intrastate, and failing to show any interstate business whatever. The companies brought suit to prevent the collection of taxes on that basis, and while that suit is pending, the board continues to use its same basis for valuation, and on that basis practically all the companies operating in the state were given heavy increase in their valuations.

Officers of the Ann Arbor Railroad have increased the pay of conductors, trainmen and firemen. Increases have already been granted to agents, operators and machine shop men. Negotiations are now going on relative to the wages of enginemen.

The Louisville & Nashville has agreed with its locomotive enginemen on a general advance in wages, which, according to the representative of the enginemen's committee, is based on the following rates per 100 miles, the new rates to take effect as of August 1: Local freight, \$5.30; through freight, \$4.90; through passenger, \$3.95; branch passenger, \$3.80. Overtime will be allowed after a given number of hours on a run. This stipulation is based on the assumption that five hours shall be allowed for each hundred miles on passenger runs, eight hours to the hundred miles for fast freights, nine hours for slow through freights and ten hours for local freights. Beyond these periods overtime will be paid for at the rate of 50 cents an hour for local freights and 49 cents an hour for passenger and through freights. Yard engineers are to be paid on a time basis, \$4.10 per day of 11 hours or less, with payments for overtime at the rate of 38 cents per hour. Engineers making a run of less than 100 miles are to be paid for 100 miles, but fractions of 100 miles otherwise will be paid for on a proportionate basis. Heretofore the rates on the different divisions of the Louisville & Nashville have not been uniform.

Trade of the United States in 1910.

Exports from the United States to America and Africa showed an increase and those to Europe and Asia a decline in the fiscal year just ended. To North America the increase was 24½ per cent., to South America 22 per cent., and to Africa 9 per cent., while to Europe the decline was about 1 per cent., and to Asia and Oceania a little over 1 per cent.

Detailed figures just completed by the Bureau of Statistics of the Department of Commerce and Labor show exports to North America 385½ million dollars in 1910, against 309½ million in 1909; to South America, 93½ million, against 76½ million in 1909; to Africa, 18½ million, against 17 million in 1909; to Europe, 1,136 million, against 1,146½ million in 1909, and to Asia and Oceania, 111½ million, against 113 million in the preceding year.

The chief growth in our exports has thus been in the trade with our next-door neighbors. To Canada the value of the exports in the fiscal year 1910 was 216 million dollars, against 163½ million in 1909, an increase of 52½ million dollars; to Mexico, 58 million, against 49½ million in 1909, an advance of 8½ million; to Cuba, 52½ million, against practically 44 million in the preceding year, an advance of 9 million; to Central America, 30½ million, against 25½ million in 1909, an increase of 5 million; to Argentina, 40½ million, against 33½ million in 1909, an increase of 7 millions; and to Brazil, 22½ million, against 17½ million in the preceding year, an increase of 5 million dollars. The percentage of gain in the exports to the principal American countries in the fiscal year 1910, compared with 1909, was as follows: Canada, 32 per cent.; Brazil, 30 per cent.; Argentina, 21 per cent.; Cuba, 20 per cent.; Central America, 20 per cent., and Mexico, 17 per cent.

In the trade with Europe, which as a whole shows a decline of about 11 million dollars in the exports of 1910 compared with those of 1909, those to Germany and France show an increase; those to the United Kingdom, Netherlands, Italy and Belgium a decline. The total exports from the United States to Germany in 1910 were valued at 249½ millions dollars, against 235½ million in 1909; those to France, 117½ million, against 108½ million in 1909; to Russia, 17½ million, against 17½ million in the preceding year; to the United Kingdom, 505½ million, against 514½ million in 1909; to Netherlands, 85 million, against 95 million in 1909; to Belgium, 41 million, against 45 million in 1909; and to Italy, 53½ million, against 58½ million dollars in 1909.

In the commerce with Asia and Oceania the exports to Japan in the fiscal year 1910 were valued at 22 million dollars, against 26½ million in 1909; to China, 16½ million, against 19½ million in 1909; and to Australia, 27½ million, against 24 million in the preceding year.

The changing character of the exports of the United States, from natural products to manufactures, is illustrated by the figures of exports to the grand divisions. The chief growth in exports occurs in the trade with North, Central and South America, the West Indies and Africa, in which manufactures naturally form a large proportion of the imports; while the chief decline in exports occurs in the trade with European countries, in which foodstuffs and manufacturers' materials form a large proportion of the imports.

On the import side the figures show an increase in the value of merchandise brought from each of the grand divisions, those from Europe in 1910 being valued at 806½ million dollars, against 654½ million in the preceding year; from North America, 306½ million, against 254 million in 1909; South America, 196 million, against nearly 164 million in 1909; Asia and Oceania, 231 million, against 224½ million in 1909; and Africa, 17½ million, against 15 million to 1909. Imports from the United Kingdom in the fiscal year 1910 were 271 million dollars, against 208½ million in 1909; Germany, 168½ million, against 143½ million in 1909; France, 132½ million, against 108½ million in 1909; Belgium, 40 million, against 27½ million in 1909; Cuba, 122½ million, against 96½ million in 1909; Argentina, 33½ million, against 22½ million in 1909; Canada, 95 million, against 79½ million in 1909; Mexico, 58½, against 47½ million in 1909; and those from Brazil, 108 million, against 98 million in 1909.

Manufactures made a new high record in the exports of the fiscal year 1910, aggregating 768 million dollars in value, against 750 million dollars in 1908, the former high record year, and forming during the year just ended about 45 per cent. of the total exports and in the closing month of the year, over 55 per

cent. of the total. Manufactures, which formed in 1910 45 per cent. of the total exports, formed in 1900 35 per cent., in 1890 21 per cent., and in 1880 15 per cent., and aggregated in 1910, 768 million dollars, against 485 million in 1900, 179 million in 1890, and 122 million in 1880.

Manufacturers' material imported also made a new high record in 1910, the total value for the year being 856 million dollars, against 673 million last year and 751 million in 1907, the former high record year.

Iron Ore Resources of the World.

In January, 1908, the executive committee of the Eleventh International Geological Congress, soon to be held in Stockholm, Sweden, sent out circulars announcing its intention to compile a summary of the iron ore resources of the world, to be a permanent contribution to the literature on this subject. The task which the geologists of Sweden set for themselves was a large one. The idea was particularly attractive to Swedish mining geologists and mine owners, in view of the prominence their country has had in recent years as a source of high grade iron ores.

The co-operation of the iron ore authorities throughout the world was solicited. Official geological surveys and many experts in mining geology were addressed.

The two volumes of text and the accompanying atlas, which have recently come from the press, are proofs of the prodigious labors of the executive committee and its collaborators. Volume I contains 550 pages, 8½ in. x 11 in., in addition to 79 pages of introduction and summary, the latter, which is a resume of the two volumes, being prepared by Hj. Sjoegren. Volume II. contains 518 pages. The work is edited by J. G. Anderson, general secretary of the congress. There are 42 maps, 13½ in. x 19½ in., and the two volumes contain 28 plates, chiefly maps and views of mines, and 137 illustrations in the text. The publisher is Generalstabens Litografiska Anstalt, Stockholm. The price of the work is £3.

The world's summary, as shown by these reports, is given below. In the first and third columns the figures represent iron ore in million tons; in the second and fourth columns the figures represent pig iron equivalents, based on the average percentage of iron in the ore.

Summary of Iron Ore Resources of the World.

(Figures given are in million tons.)

	Actual-		Reserves		Potential-
	Ore.	Iron	Ore.	Iron	
Europe	12,032	4,733	41,029	12,075	+considerable.
America	9,855	5,154	81,822	40,731	+enormous.
Australia	136	74	69	37	+considerable.
Asia	260	156	437	283	+enormous.
Africa	125	75	....*	....*	+enormous.
Totals	22,408	10,192	123,377†	53,136	+enormous.

*Many thousands.

†Plus many thousands of millions.

"Railway" Reading Matter.

The Chicago, Burlington & Quincy has found that Dr. Charles W. Eliot's "five feet of books" are not the kind of literature that travelers on its trains are hungering for. Daniel Willard, formerly vice-president of the Burlington and now president of the Baltimore & Ohio, who is one of the students and booklovers among high railway officers, was greatly interested in Dr. Eliot's list of books when it was announced and caused sets of the books to be put on the Burlington road's best trains. A record was kept of the use made of the books from November 21, 1909, to January 16, 1910, on four trains. Each set contained 44 volumes and the total number of books taken from the shelves to be read was 25. It is estimated that meantime the books were available for perusal by 49,500 people. The travelers seemed to be very little attracted by Adam Smith's "Wealth of Nations," Darwin's "Origin of Species," etc. In consequence, new libraries have been bought, consisting of more popular reading matter.

In this connection the following comment from the New York *Evening Post* will be of interest: "The action of the Burlington in removing Dr. Eliot's famous five feet of classics from its library cars involves no reflection either on the classics or on the Burlington. Serious reading at their best, Dr. Eliot's books

should never have been subjected to the railway test. The mission of the literary classic is that of an ever-present companion to whom one may turn when the proper mood arises, and not till then. The classic is read and should be read only when the desire for it arises; it should be the object in itself. It is only degrading it to make it a mere instrument for whiling away the dreariness of a long journey on the cars. To each end its proper means. To put Marcus Aurelius in the same class with big, black cigars and auction pinocchio as alleviators of railway tedium is to do honor neither to Marcus Aurelius, nor to literature, nor to common sense. If literature with "snap" and "go" in it is ever in place, it certainly is on a fast express between Chicago and the Pacific Coast."

Late Trains in June.

The New York Public Service Commission, Second District, has issued the record of passenger train operations in the state for the month of June. During that month 63,717 trains were operated over the steam railways of the state. For the corresponding month in 1909 there were 55,551 trains run, and for the corresponding month in 1908, 50,122. Of all trains run 88 per cent. were on time at divisional terminals. The average delay for each late train was 21.2 minutes. The principal causes of delay were waiting for trains on other divisions, 28.3 per cent.; train work at stations, 18.5 per cent.; waiting for train connections with other railways, 11.5 per cent.; trains ahead, 7.6 per cent.; wrecks, 7.2 per cent.; engine failures, 6.9 per cent.; and meeting and passing trains, 6.4 per cent. The record of trains on time for the principal railways is as follows: Boston & Albany, 95 per cent.; Boston & Maine, 80 per cent.; Buffalo, Rochester & Pittsburgh, 75 per cent.; Buffalo & Susquehanna, 86 per cent.; Central New England, 83 per cent.; Delaware & Hudson, 91 per cent.; Delaware, Lackawanna & Western, 92 per cent.; Erie, 92 per cent.; Lake Shore & Michigan Southern, 79 per cent.; Lehigh Valley, 92 per cent.; Long Island, 82 per cent.; New York Central & Hudson River, 88 per cent.; New York, Chicago & St. Louis, 83 per cent.; New York, New Haven & Hartford, 94 per cent.; New York, Ontario & Western, 79 per cent.; Pennsylvania, 89 per cent.; Rutland, 75 per cent.; Ulster & Delaware, 86 per cent.

Disastrous Collision in France.

Press despatches of August 14 report a rear end collision at Saujon, France, on that date, in which 37 persons were killed and a large number injured. An excursion train from Bordeaux, carrying several hundred passengers, ran at high speed into the rear of a freight train. Several of the passenger cars were completely crushed. Many of the victims were school girls. According to one account, the collision was due to a misplaced switch.

Safety Appliance Hearing Sept. 29.

The Interstate Commerce Commission has prepared a code of specifications for hand brakes, sill steps, ladders, running boards, etc., for cars and engines (the regulation of which details comes within the authority of the commission after July 1, 1911), and has announced that a hearing will be held at Washington September 29, at which may be presented arguments for or against the adoption of the proposed specifications. Any person interested may send his views in writing beforehand.

Railway Signal Association.

Secretary C. C. Rosenberg announces that on the occasion of the annual meeting at Richmond, Va., October 11, 12 and 13, the headquarters of the association will be at the Hotel Jefferson. The prices for rooms (European plan) vary from \$1.50 a day for one person in a single room overlooking the court, to \$5 for two persons in a double room, with bath, on the main front of the hotel.

International Railway Congress.

The next meeting of the International Railway Congress will be held in Berlin, Germany, in 1915.

MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

AIR BRAKE ASSOCIATION.—F. M. Nellis, 58 State St., Boston, Mass.

AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Scranton, Pa.; next meeting June 22, 1911; Niagara Falls, N. Y.

AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.—C. M. Burt, Boston, Mass.; next meeting, St. Paul, Minn.

AMERICAN ASS'N OF LOCAL FREIGHT AGENTS' ASS'N.—G. W. Dennison, Penna. Co., Toledo, Ohio.

AMERICAN ASS'N OF RAILROAD SUPERINTENDENTS.—O. G. Fetter, Carew Bldg., Cincinnati, Ohio; Sept. 16; St. Louis.

AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 24 Park Place, New York; semi-annual, Nov. 16; St. Louis, Mo.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago; Oct. 18; Fort Worth, Tex.

AMERICAN RAILWAY ENGINEERING AND MAINT. OF WAY ASS'N.—E. H. Fritch, Monadnock Bldg., Chicago; March 21-23, 1911; Chicago.

AMERICAN RAILWAY INDUSTRIAL ASSOCIATION.—G. L. Stewart, St. L. S. W. Ry., St. Louis, Mo.

AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Old Colony Building, Chicago.

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—O. T. Harroun, Bloomington, Ill.

AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. Edgar Marburg, Univ. of Pa., Philadelphia.

AM. SOC. OF CIVIL ENGS.—C. W. Hunt, 220 W. 57th St., N. Y.; 1st and 3d Wed., except July and Aug.; annual, Jan. 18-19, New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 29th St., N. Y.; annual, Dec. 6-9; New York.

AMERICAN STREET AND INTERURBAN RAILWAY ASS'N.—H. C. Donecker, 29 W. 39th St., New York; Oct. 10-14; Atlantic City.

ASSOCIATION OF AM. RY. ACCOUNTING OFFICERS.—C. G. Phillips, 143 Dearborn St., Chicago; April 26, 1911; New Orleans, La.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—J. R. McSherry, C. & E. I., Chicago; May, 1911; Montreal, Can.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—G. B. Colegrove, I. C. R.R., Chicago; annual, Sept. 27-30; Chicago.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, 135 Adams St., Chicago; June 19, 1911; Boston.

ASS. OF TRANS. AND CAR ACC. OFFICERS.—G. P. Conzard, 24 Park Place, N. Y.; Dec. 13-14, Chicago; June 20-21, 1911, Cape May City, N. J.

CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 1st Tues. in month, except June, July and Aug.; Montreal.

CANADIAN SOCIETY OF CIVIL ENGS.—Clement H. McLeod, 413 Dorchester St., Montreal, Que.; Thursdays; Montreal; annual, last week January.

CAR FOREMAN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 North 50th Court, Chicago; 2d Monday in month; Chicago.

CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Friday in January, March, May, Sept. and Nov.; Buffalo.

ENGINEERS' SOCIETY OF PENNSYLVANIA.—E. R. Dasher, Box 704, Harrisburg, Pa.

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—E. K. Hiles, 808 Fulton bldg., Pittsburgh; 1st and 3d Tues.; annual, Jan. 17, 1911, Pittsburgh.

FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Rich, Fred. & Pot. R.R., Richmond, Va.; 20th annual, June 21, 1911; St. Paul, Minn.

GENERAL SUPERINTENDENTS' ASS'N OF CHICAGO.—H. D. Judson, 209 Adams St., Chicago; Wednesday preceding 3d Thursday; Chicago.

INTERNATIONAL MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York; next convention, Omaha, Neb.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—D. B. Sebastian, La Salle St. Station, Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—L. H. Bryan, D. & I. R. Ry., Two Harbors, Minn.

INTERNATIONAL RAILWAY MASTER BLACKSMITHS' ASS'N.—A. L. Woodworth, Lima, Ohio.

INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, rue de Louvain, 11 Brussels; 1915, Berlin.

IOWA RAILWAY CLUB.—W. B. Harrison, Union Station, Des Moines, Ia.; 2d Friday in month, except July and August; Des Moines.

MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Old Colony; Chicago.

MASTER CAR AND LOCO. P. INTERS' ASS'N OF U. S. AND CANADA.—A. P. Dane, H. & M. Pealing, Mass.; annual, St. Louis, Sept. 13-16.

NEW ENGLAND RAILROAD CLUB.—G. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tuesday in month, ex. June, July, Aug. and Sept.; Boston.

NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August; New York.

NORTH-WEST RAILWAY CLUB.—T. W. Flanagan, Soo Line, Minn.; 1st Tues. after 2d. Mon., ex. June, July, August; St. Paul and Minn.

NORTHERN RAILWAY CLUB.—C. L. Kennedy, C. M. & St. P., Duluth; 4th Saturday; Duluth, Minn.

OMAHA RAILWAY CLUB.—A. H. Christiansen, Barker Blk.; Second Wed.

RAILWAY CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas City; 3d Friday in month; Kansas City.

RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, Pittsburgh, Pa., 4th Friday in month, except June, July and August; Pittsburgh.

RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, 12 North Linden St., Bethlehem, Pa.; annual, Oct. 11-13; Richmond, Va.

RAILWAY S'KEEPERS' ASS'N.—J. P. Murphy, Box C, Collinwood, O.; annual, May, 1911.

RICHMOND RAILROAD CLUB.—F. O. Robinson; 2d Monday; Richmond.

ROADMASTERS' AND MAINTENANCE OF WAY ASS'N.—Walter E. Emery, P. & P. U. Ry., Peoria, Ill.; annual, Sept. 18-19; Chicago.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug.; St. Louis.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—C. Nyquist, La Salle St. Station, Chicago; Oct. 25 and 26; Hotel Chamberlin, Old Point Comfort, Va.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. R. Ry., Montgomery, Ala.; annual, Oct. 20; Atlanta.

SOUTHERN & SOUTHWESTERN R.R. CLUB.—A. J. Merrill, Prudential Bldg., Atlanta; 3d Thurs., Jan., Mar., July, Sept. and Nov.; Atlanta.

TOLEDO TRANSPORTATION CLUB.—L. G. Macomber, Woolson Spice Co., Toledo; 1st Sat.; annual, May 6, 1911, Toledo.

TRANSPORTATION CLUB OF BUFFALO.—J. M. Seils, Buffalo; 1st Sat. after 1st Wed.; annual, Dec. 13.

TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 290 Broadway, New York; last Tuesday in month, except June, July and August; New York.

TRAIN DESPATCHERS' ASS'N OF AMERICA.—J. F. Mackie, 7042 Stewart Ave., Chicago; annual, June 20, 1911; Baltimore.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo.

WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg; 2d Monday, except June, July and August; Winnipeg.

WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, Monadnock Bldg., Chicago; Wednesdays, except July and August; Chicago.

Traffic News.

Officers of the Chicago, Milwaukee & St. Paul expect to begin running passenger trains through to the Pacific coast over the St. Paul lines September 15.

The Northern Pacific has taken off through passenger trains No. 7 and No. 8 west of Glendive, Mont.; and trains 15 and 16 between St. Paul and Mandan, N. Dak.

The Philadelphia & Reading has re-established on the Shamokin division the passenger fares which were in effect before the reduction that was made in consequence of the Pennsylvania law in 1906.

There was received and forwarded at Indianapolis in the week ended July 31 a total of 34,578 cars, of which 27,838 cars were loaded. This compares with 24,673 loaded cars in the corresponding week of 1909 and 22,403 in 1908.

The St. Louis & San Francisco has contracted for trackage rights from Paris, Tex., to Dallas, 98 miles, over the Gulf, Colorado & Santa Fe; and from Dallas to Fort Worth, 34 miles, over the Rock Island lines, and is running its own trains through to Dallas and Fort Worth. The route of the Frisco trains from St. Louis to Dallas will now be 87 miles shorter than that of the Missouri, Kansas & Texas, and 27 miles shorter than the St. Louis, Iron Mountain & Southern.

Grain merchants represented in the Philadelphia Commercial Exchange, who, for a long time, have been protesting against the practice of the railways in making a charge for reconsigning carloads of grain, are now demanding that bills of lading be always dated the date on which the cars start. They claim that in Chicago bills are dated when the grain is loaded, but that shippers, for purposes of their own, secure the detention of the cars in Chicago from one to five days after they are loaded.

G. M. Brown, examiner for the Interstate Commerce Commission, opened, in New York City, last Monday, the hearing announced some time since on the proposed advances in freight rates which have been announced by the trunk lines and which were suspended at the request of the commission; but, by mutual agreement, the hearing was adjourned to September 7. Mr. McCain, chairman of the Trunk Line Association, said that the postponement would enable the railways to present their data in better shape than could be done at present and that the work of the commission would thus be facilitated.

Attorney-General Charles West, of Oklahoma, has issued an open letter to the public, suggesting the expediency of making an arrangement with the railways whereunder passengers shall pay a fare of 2½ cents a mile in Oklahoma instead of 2 cents a mile, and having the roads issue in return a coupon at the rate of 1 cent a mile which can be redeemed in case the state 2-cent fare law, which is in litigation, shall be held valid. He says he believes the roads probably would be willing to make the proposed arrangement, as it would save them a contingent liability of ½ a cent a mile and also a large amount of book-keeping expenses. On the other hand, it would save travelers ½ a cent a mile in case the 2-cent fare law should finally be held invalid.

Freight Car Balance and Performance.

Arthur Hale, chairman of the committee on relations between railways of the American Railway Association, in presenting statistical bulletin No. 78, covering car balance and performance for April, 1910, says:

"There was a slackening of traffic in April, and the beginning of a homeward movement of cars, the cars on the home lines increasing from 54 per cent. in March to 56 per cent. in April, with a corresponding decrease in the loaded mileage, which dropped from 71.3 per cent. to 68.7 per cent. There was a slight increase in the shop cars, which still held down close to the minimum. The average for April was 5.51 per cent.

"The miles per car per day averaged 24.0, which included idle cars equal to 4.49 per cent. of the total on line. This compares

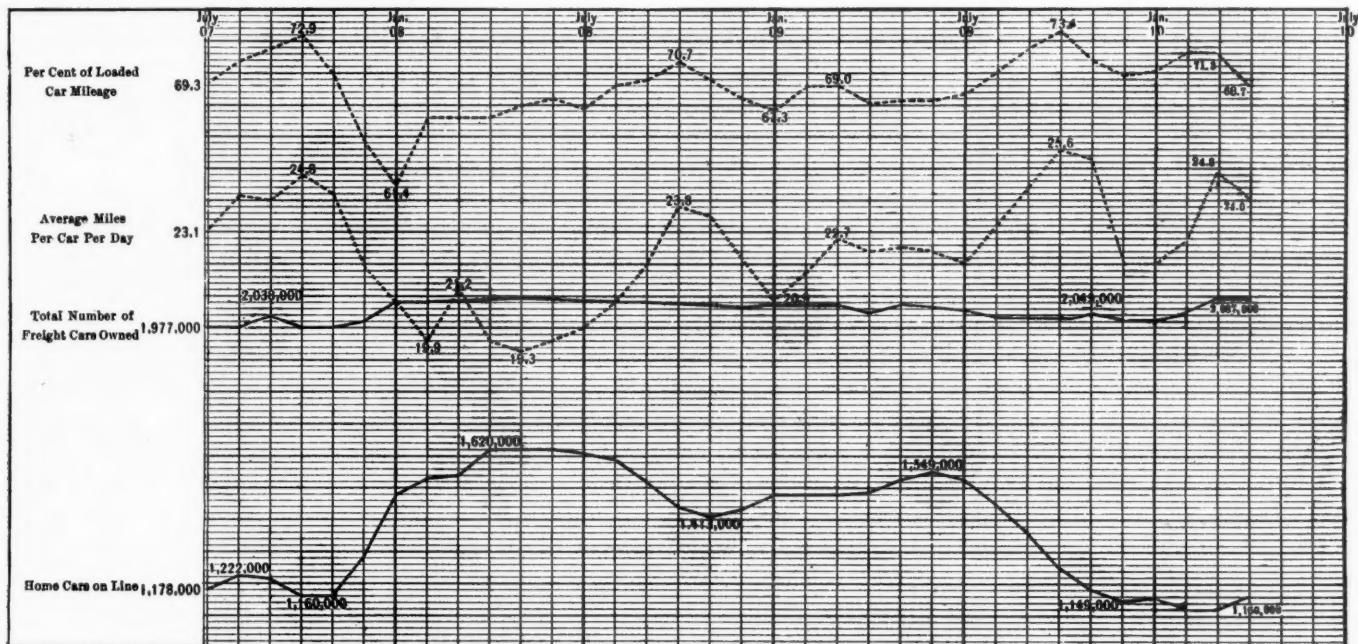
CAR BALANCES AND PERFORMANCES IN APRIL, 1910.												
	N. Y., N. J., Ohio, Ind., Va., W. Va., Ky., Tenn., Miss., Ala., Ga., Fla., Carolina, No. and So. Western Pa.	Iowa, Ill., Wis., Minn.	Mont., Wyo., Neb., Dakotas, Colo., Okla., Mo., Ark.	Kan., Colo., Okla., Mo., Ark., Tex., La., New Mex.	Ore., Nev., Idaho, Nev., Cal., Ariz.	Canadian Lines.	Grand Total.					
New England.	76,941	211,615	170,632	169,690	386,068	17,241	133,979	26,176	117,757	89,766	2,087,017	
DeL. Md., Eastern Pa.	687,152	354,941	110,683	92,772	82,575	263,798	5,693	75,574	17,255	59,714	1,157,067	
Average number of system cars on line	38,250	102,171	69,255	61,756	203,082	14,932	50,508	18,779	57,099	26,479	926,364	
Railway-owned cars: Average foreign on line	40,941	634,303	212,854	162,027	144,331	466,880	20,895	126,082	36,034	116,813	84,021	
Total cars on line.	79,191	2,250	1,239	.....	.....	80,812	3,654	.....	9,838	.....	.....
Excess	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Per cent. of cars on line to total owned:												
Home	50	52	53	54	49	49	48	34	56	66	51	
Foreign	53	40	48	41	36	53	87	38	72	48	30	
All railroads	103	92	101	95	85	121	121	94	138	99	64	
Home	3,075	37,047	9,574	4,042	6,405	17,330	1,200	6,239	3,007	9,723	56	
Foreign	82,266	671,350	222,428	166,069	150,736	484,210	22,095	132,321	39,041	126,536	44	
Revenue freight cars owned	4,31	5,13	6,32	5,75	6,51	4,29	5,16	10,16	5,34	5,23	5,51	
Average number of system cars on line	1,126	10,244	2,789	2,988	2,529	6,341	468	2,514	760	2,336	33,981	
Railway-owned cars: Average foreign on line	43,715,114	482,804,973	142,431,296	126,630,425	121,525,798	302,987,76	47	53	51	54	64	
Total cars on line.	17,7	24.0	21.3	25.4	26.9	21.0	37.3	24.1	30.1	31.4	24.0	
Excess	75.3	68.1	68.1	65.6	68.9	69.4	71.5	65.5	64.2	68.5	68.7	
Per cent. of cars on line to total owned:	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Home	11.2	15.5	14.5	15.6	13.5	12.4	15.4	13.4	11.0	14.4	14.2	
Foreign	14.9	22.7	21.3	23.7	18.8	18.6	21.5	20.5	17.2	21.2	20.9	
All railroads	19.9	37.1	31.3	39.6	36.3	241	606	332	332	450	340	
Total, all cars on line	82,266	671,350	222,428	166,069	150,736	484,210	22,095	132,321	39,041	126,536	2,183,356	
Per cent. of cars in shop	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
No. of freight engines owned	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Average cars on line per freight engine owned	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total freight-car mileage	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Average miles per car per day	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Per cent. loaded mileage	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ton-miles of freight, including Company freight	490,744,644	7,467,533,579	1,985,531,457	1,972,457,366	1,626,401,448	2,797,024,753	363,611,038	1,278,681,244	388,744,006	1,681,175,501	1,061,775,014	
Average ton-miles, including Company freight:	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Per car-mile.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Per loaded car-mile	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Per car per day	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Gross freight earnings	\$5,764,224	\$47,149,266	\$12,025,987	\$11,820,314	\$10,239,442	\$28,837,087	\$2,919,104	\$10,220,917	\$2,948,837	\$14,770,280	\$7,528,412	
Average daily earnings: Per car owned	\$2.50	\$2.29	\$1.89	\$2.31	\$2.01	\$2.49	\$5.65	\$2.54	\$3.76	\$4.18	\$2.84	
Per railroad-owned car on line	2.43	2.48	1.88	2.43	2.36	2.06	4.65	2.70	2.73	4.21	3.00	
All cars on line	2.34	2.34	1.80	2.37	2.26	1.99	4.40	2.57	2.52	3.89	2.92	

quite favorably with March, when the surplus was about one-half of that reported for April. The tons per loaded car fell from 21.6 to 20.9, the decrease being accounted for by the lessened coal traffic, due to mine suspensions in a number of states.

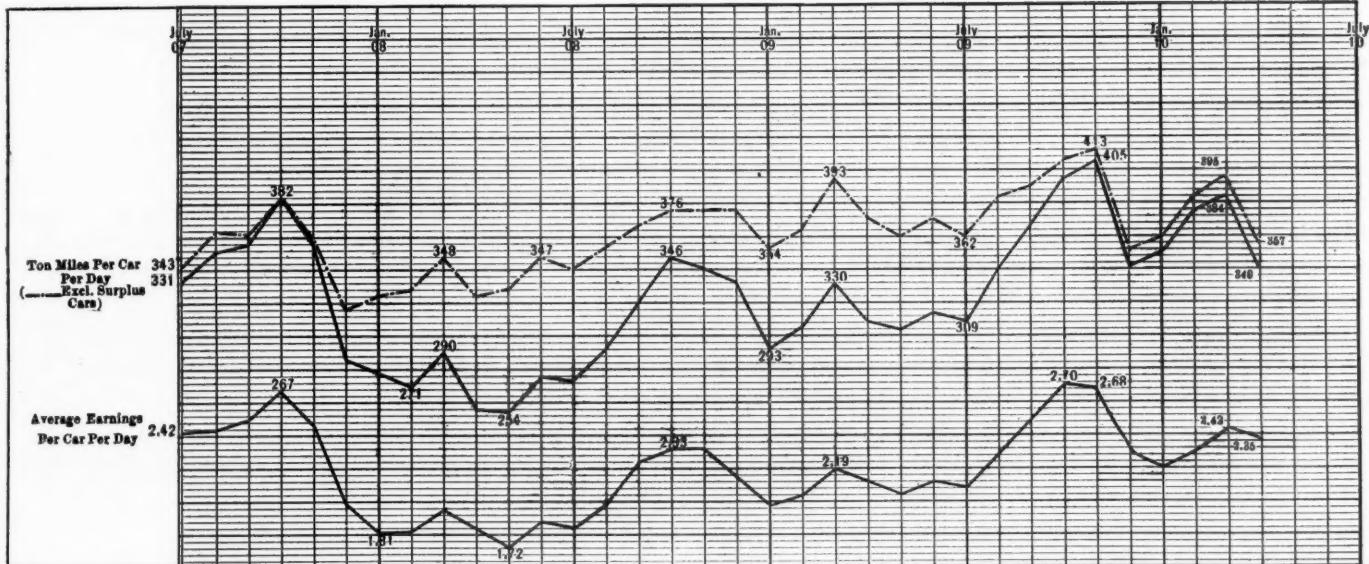
"The ton miles per car per day and the daily average per car both show a decrease (the former to 340 and the latter to \$2.35). The loss in earnings was much less than the loss in tonnage, this result also being explained by the decrease in coal traffic, which carries a lower rate than the average for all commodities."

Felton, "which emanated from New York, was that railway gross earnings in 1909 exceeded those of 1907 by \$57,000,000, and that railway net earnings in 1909 exceeded those of 1907 by \$147,000,000. Now, the fact is that railway gross earnings in 1909 were \$170,428,040 less than they were in 1907, and net earnings in 1909 were \$21,355,636 less than in 1907.

"After reading such an entirely incorrect statement as this, one is prepared for the exaggeration in a despatch from Washington regarding what the proposed increase in freight rates in



Car Performance in 1907, 1908, 1909 and 1910.



Car Earnings and Loading in 1907, 1908, 1909 and 1910.

The table shows car balance and performance for the period covered by the report and the charts show earning and performance figures, in the last three years.

Misstatements in Regard to Earnings.

President S. M. Felton, of the Chicago Great Western, gave out a statement on August 15 regarding the erroneous reports that are constantly being put into circulation regarding railway affairs. He referred particularly to statements given out in New York and Washington, and appearing in despatches in Monday morning's papers. "One of these statements," said Mr.

official classification territory would amount to. It was stated that the proposed increases in freight rates would average 16 per cent., and that if they went into effect they would increase railway earnings by \$500,000,000. Now, the fact is that the freight earnings of the roads designated by the Interstate Commerce Commission as groups I., II. and III., which handle practically all the business in official territory, were, in 1907, the most prosperous year in their history, but \$786,545,547. Consequently, a 16 per cent. increase in their rates would amount to about \$125,000,000, or only one-fourth as much as asserted. Furthermore, it is probably an exaggeration to say that the increase in rates will average anywhere near 16 per cent."

REVENUES AND EXPENSES OF RAILWAYS.

MONTH OF JUNE, 1910.

(See also issues of August 5 and 12.)

Name of road.	Mileage operated; end of period.			Operating revenues			Maintenance			Way and Of			Trans- portation.			Net operating revenues			Outside operations, net.			Operating income (or loss).				
	Freight.	Passenger.	Total.	inc. misc.	Passenger.	Traffic.	inc. misc.	structures, equipment.	inc. misc.	Passenger.	Traffic.	inc. misc.	inc. misc.	inc. misc.	General.	Total.	inc. misc.	Taxes.	inc. misc.	Operating income (or loss).	inc. misc.	Operating income (or loss).	inc. misc.	Increase (or decrease) comp. with last year.		
Atlanta, Birmingham & Atlantic	\$133,807	\$4,594	\$137,601	204	880,603	27,500	917,904	1,273,412	3,664,201	598,210	502,345	475,772	13,442	108,373	\$80,827	\$14,251	88,205	\$164,114	\$29,600	\$10,000	\$19,600	\$30,368				
Bessemer & Lake Erie	2,243	2,061,218	2,245,461	939	1,883,450	1,831,450	1,939	2,452,748	2,515,559	346,906	1,098,816	1,074,081	51,719	726,147	1,808,354	104,571	3,079,660	584,541	503,034	6,549	497,934	79,223				
Chesapeake & Ohio	1,939	1,831,450	1,939	63,098	1,098,816	1,074,081	285	87,928	25,012	121,138	17,237	17,004	37,574	40,875	81,215	1,685,393	830,166	42,503	761,015	—	233,207					
Chicago, Cincinnati & Louisville	1,466	1,027,406	1,466	1,027,406	1,027,406	1,027,406	1,466	1,715,591	1,723,88	1,567,338	1,567,338	1,567,338	52,291	75,659	69,010	40,256	67,703	45,113	42,114	7,424	79,244	133,964				
Chicago, Milwaukee & Puget Sound	1,466	1,027,406	1,466	1,027,406	1,027,406	1,027,406	1,466	1,567,338	1,567,338	1,567,338	1,567,338	1,567,338	52,291	75,659	69,010	40,256	67,703	45,113	42,114	7,424	79,244	133,964				
Chicago, Milwaukee & St. Paul	7,511	3,662,312	7,511	3,662,312	3,662,312	3,662,312	7,511	6,755,4	5,667,338	6,755,4	5,667,338	5,667,338	52,363	1,135,591	2,138,846	85,168	3,184,380	2,082,551	28,146	216,041	1,895,064	433,382				
Chicago, Rock Island & El Paso	7,396	3,113,980	7,396	3,113,980	3,113,980	3,113,980	7,396	5,667,338	6,755,4	5,667,338	5,667,338	5,667,338	52,363	1,027,406	1,027,406	1,027,406	1,027,406	1,027,406	2,244,480	—	1,938,525					
Detroit, Toledo & Ironton	441	134,472	134,472	134,472	134,472	134,472	518	12,174	156,345	33,253	13,199	13,358	81,999	442,195	1,995,365	220,012	3,40,582	2,47,009	338,220	1,909,351	1,909,351	—	84,480			
Duluth, South Shore & Atlantic	606	190,092	98,000	284,990	284,990	284,990	518	163,984	163,984	163,984	163,984	163,984	10,610	102,994	5,284	136,093	20,252	90	8,479	17,079	11,862	—	84,702			
Florida, East Coast	583	163,984	163,984	163,984	163,984	163,984	583	163,984	163,984	163,984	163,984	163,984	39,440	3,834	97,535	10,582	196,557	88,333	88,333	8,790	19,771	81,525	36,693			
Fort Worth & Denver City	1,027	2,78,874	1,027	2,78,874	1,027	2,78,874	1,027	120,394	120,394	120,394	120,394	120,394	57,754	57,754	9,962	124,012	14,938	121,063	20,020	17,130	6,078	216,4290	—			
Galveston, Harrisburg & San Antonio	1,338	577,557	577,557	577,557	577,557	577,557	577,557	221,155	221,155	221,155	221,155	221,155	84,494	84,494	24,436	81,381	12,182	27,969	300,630	28,146	216,041	1,895,064	433,382			
Gulf, Colorado & Santa Fe	1,518	533,670	533,670	533,670	533,670	533,670	533,670	250,430	250,430	250,430	250,430	250,430	12,174	12,174	12,174	220,412	3,40,582	2,47,009	338,220	1,909,351	1,909,351	—	84,480			
Houston, East and West Texas	191	70,694	29,950	106,952	106,952	106,952	191	21,998	21,998	21,998	21,998	21,998	10,610	102,994	5,284	136,093	20,252	90	8,479	17,079	11,862	—	84,702			
Iowa, Central	558	200,123	50,757	266,434	266,434	266,434	558	150,757	150,757	150,757	150,757	150,757	45,166	45,166	45,166	10,610	102,994	5,284	136,093	20,252	90	8,479	17,079	11,862	—	84,702
Louisiana, Western	198	94,900	50,757	145,946	145,946	145,946	198	120,394	120,394	120,394	120,394	120,394	39,440	3,834	97,535	10,582	196,557	88,333	88,333	8,790	19,771	81,525	36,693	—		
Minneapolis & St. Louis	1,454	2,54,559	1,454	2,54,559	1,454	2,54,559	1,454	123,304	123,304	123,304	123,304	123,304	40,910	40,910	40,910	12,174	12,174	12,174	220,412	3,40,582	2,47,009	338,220	1,909,351	1,909,351	—	84,480
Montgomery, L. & S. C. & S. C. & S. C.	448	226,515	91,502	326,249	326,249	326,249	448	171,733	171,733	171,733	171,733	171,733	23,201	23,201	23,201	12,174	12,174	12,174	220,412	3,40,582	2,47,009	338,220	1,909,351	1,909,351	—	84,480
New York, Chicago & St. Louis	560	63,479	12,174	75,619	75,619	75,619	560	145,586	145,586	145,586	145,586	145,586	12,174	12,174	12,174	12,174	12,174	12,174	220,412	3,40,582	2,47,009	338,220	1,909,351	1,909,351	—	84,480
New York, Susquehanna & Western	151	145,586	145,586	145,586	145,586	145,586	151	120,394	120,394	120,394	120,394	120,394	30,432	30,432	30,432	12,174	12,174	12,174	220,412	3,40,582	2,47,009	338,220	1,909,351	1,909,351	—	84,480
Norfolk Southern	602	120,394	120,394	120,394	120,394	120,394	602	120,394	120,394	120,394	120,394	120,394	33,198	33,198	33,198	12,174	12,174	12,174	220,412	3,40,582	2,47,009	338,220	1,909,351	1,909,351	—	84,480
Northwestern Pacific Co.	583	163,984	163,984	163,984	163,984	163,984	583	163,984	163,984	163,984	163,984	163,984	31,199	31,199	31,199	12,174	12,174	12,174	220,412	3,40,582	2,47,009	338,220	1,909,351	1,909,351	—	84,480
St. Joseph & Grand Island	1,027	2,78,874	1,027	2,78,874	1,027	2,78,874	1,027	120,394	120,394	120,394	120,394	120,394	31,199	31,199	31,199	12,174	12,174	12,174	220,412	3,40,582	2,47,009	338,220	1,909,351	1,909,351	—	84,480
St. Louis & San Francisco	470	2,78,874	1,027	2,78,874	1,027	2,78,874	1,027	120,394	120,394	120,394	120,394	120,394	31,199	31,199	31,199	12,174	12,174	12,174	220,412	3,40,582	2,47,009	338,220	1,909,351	1,909,351	—	84,480
St. Louis, San Antonio, & Aransas Pass	772	1,274,376	1,274,376	1,274,376	1,274,376	1,274,376	772	1,274,376	1,274,376	1,274,376	1,274,376	1,274,376	1,274,376	1,274,376	1,274,376	1,274,376	1,274,376	1,274,376	1,274,376	1,274,376	1,274,376	1,274,376	1,274,376			
St. Louis, Southwestern & Atlantic	606	120,394	120,394	120,394	120,394	120,394	606	120,394	120,394	120,394	120,394	120,394	31,199	31,199	31,199	12,174	12,174	12,174	220,412	3,40,582	2,47,009	338,220	1,909,351	1,909,351	—	84,480
Toledo, St. Louis & Western	450	248,213	248,213	248,213	248,213	248,213	450	248,213	248,213	248,213	248,213	248,213	37,680	37,680	37,680	24,105	24,105	24,105	10,398	19,383	10,398	957	80,103	—	84,480	
Toledo, St. Louis & Western	450	248,213	248,213	248,213	248,213	248,213	450	248,213	248,213	248,213	248,213	248,213	37,680	37,680	37,680	24,105	24,105	24,105	10,398	19,383	10,398	957	80,103	—	84,480	
Atlanta, Birmingham & Atlantic	662	\$1,908,238	\$1,908,238	\$1,908,238	\$1,908,238	\$1,908,238	\$1,908,238	\$1,908,238	\$2,579,345	\$2,579,345	\$2,579,345	\$2,579,345	\$2,579,345	\$111,628	\$112,848	\$1,016,665	\$102,932	\$1,099,956	\$570,889	\$192,054	\$192,054	\$192,054	\$192,054	\$192,054	\$192,054	\$192,054
Bessemer & Lake Erie	2,443	1,254,555	1,254,555	1,254,555	1,254,555	1,254,555	2,443	1,254,555	1,254,555	1,254,555	1,254,555	1,254,555	1,254,555	1,254,555	1,254,555	1,254,555	1,254,555	1,254,555	1,254,555	1,254,555	1,254,555	1,254,555	1,254,555			
Chesapeake & Ohio	1,939	24,901,199	24,901,199	24,901,199	24,901,199	24,901,199	1,939	24,901,199	24,901,199	24,901,199	24,901,199	24,901,199	31,199	31,199	31,199	12,174	12,174	12,174	220,412	3,40,582	2,47,009	338,220	1,909,351	1,909,351	—	84,480
Chicago																										

Car Surpluses and Shortages.

Arthur Hale, chairman of the committee on relations between railways of the American Railway Association, in presenting statistical bulletin No. 77 giving a summary of car shortages and surpluses by groups from March, 31, 1909, to August 3, 1910, says:

"The total surplus reported for the date of this bulletin is

cars in group 2 (Eastern) and stock in groups 6 (Northwestern), 8 (Middle Western) and 10 (Pacific). The beginning of the grain movement is largely responsible for the quickened demand for box cars. The decrease in surplus is not confined, however, to the large grain producing sections, but groups 2 (Eastern) and 2 (Middle) show large reductions in this class, indicating that the demand has extended to that territory. There are some scattering shortages reported and some requests by

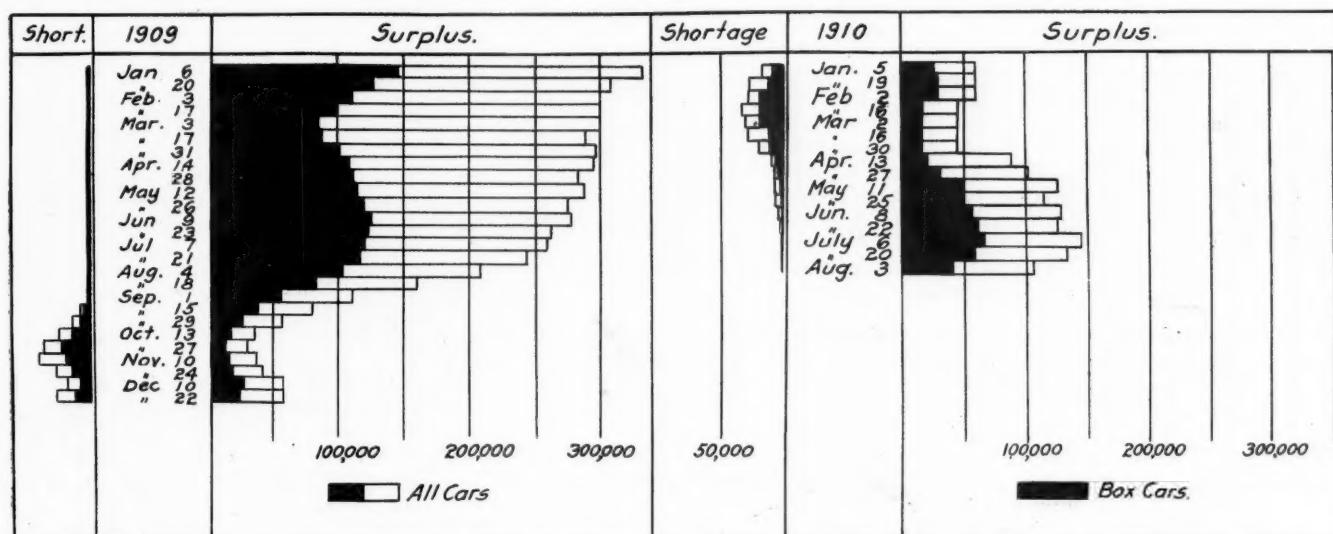
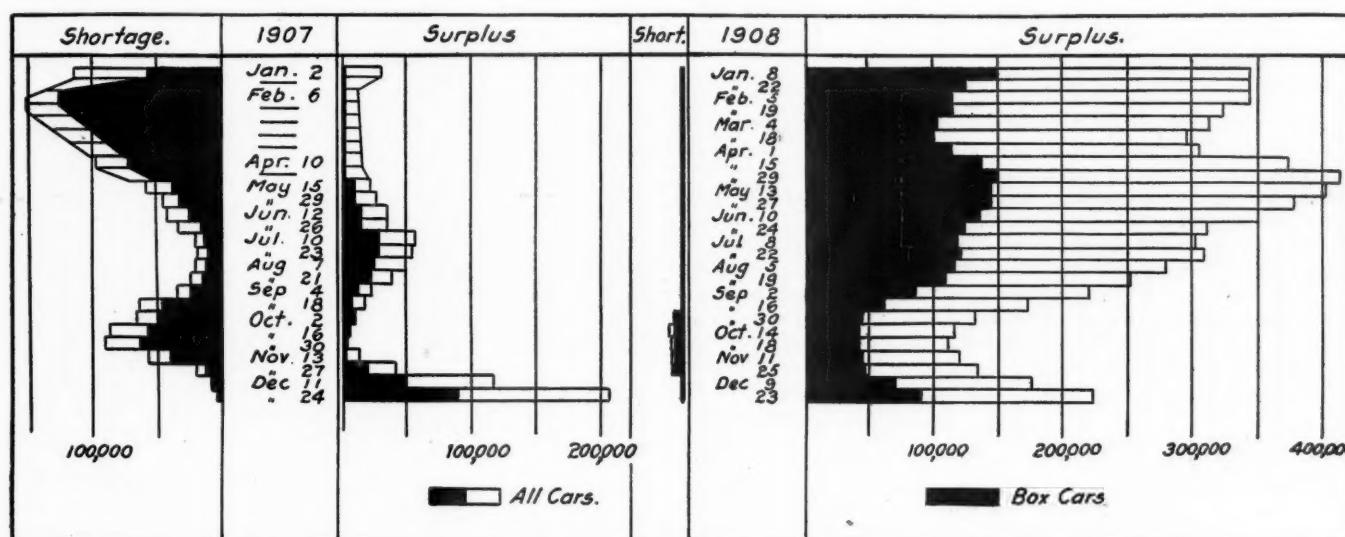
CAR SURPLUSES AND SHORTAGES.

Date.	No. of roads.	Surpluses				Shortages					
		Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Total.	Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Total.
Group 1.—August 3, 1910.....	8	604	401	428	82	1,515	153	57	75	0	285
" 2, " 3, 1910.....	23	5,818	128	9,684	9,965	25,595	33	0	13	7	53
" 3, " 3, 1910.....	22	15,278	543	6,671	2,764	25,256	62	154	9	208	433
" 4, " 3, 1910.....	11	2,647	94	959	1,215	4,915	47	165	0	0	212
" 5, " 3, 1910.....	20	1,876	328	2,018	1,649	5,871	150	35	0	0	185
" 6, " 3, 1910.....	20	7,958	707	3,005	4,804	16,474	229	1	28	108	366
" 7, " 3, 1910.....	3	288	89	131	271	779	0	0	0	0	0
" 8, " 3, 1910.....	12	2,561	84	3,790	3,513	9,948	50	12	0	3	65
" 9, " 3, 1910.....	11	1,458	299	300	788	2,845	167	8	16	0	191
" 10, " 3, 1910.....	20	1,536	1,011	2,082	5,640	10,359	560	30	0	0	590
" 11, " 3, 1910.....	5	1,016	15	25	951	2,007	0	258	0	145	403
Grand total	155	41,040	3,789	29,093	31,642	105,564	1,451	720	141	471	2,783

*Group 1 is composed of New England lines; Group 2—New York, New Jersey, Delaware, Maryland, and Eastern Pennsylvania lines; Group 3—Ohio, Indiana, Michigan, and Western Pennsylvania lines; Group 4—West Virginia, Virginia, and North and South Carolina lines; Group 5—Kentucky, Tennessee, Mississippi, Alabama, Georgia and Florida lines; Group 6—Iowa, Illinois, Wisconsin, Minnesota, and North and South Dakota lines; Group 7—Montana, Wyoming and Nebraska lines; Group 8—Kansas, Colorado, Missouri, Arkansas and Oklahoma lines; Group 9—Texas, Louisiana and New Mexico lines; Group 10—Oregon, Idaho, California and Arizona lines; Group 11—Canadian lines.

105,564, a decrease of 29,030 since our last report. Of this decrease 17,827 are box cars, 8,126 coal and gondola and 3,433 miscellaneous, the decrease in the latter being principally coke

grain carrying roads for assistance from lines still holding a surplus. As regards the coal car situation, the reports denote an increase in the demand for this class of cars, and with traffic



Car Surpluses and Shortages in 1907, 1908, 1909 and 1910.

equal to that of August, 1909, the present surplus should practically disappear by September 1.

The committee recommends to the railways that they urge the public to make all possible shipments immediately while there is still a surplus of cars. If they will begin their fall shipments earlier than usual they will postpone to that extent the car shortage which now seems inevitable. The general adoption and enforcement of the car demurrage rules has done much to improve the situation, but the committee would further recommend that all industries be requested to unload cars as much as possible within the free time allowed by the demurrage rules.

The committee also reminds the railways that the prompt handling of traffic and of empty cars will likewise do much to postpone the shortage.

The accompanying table gives car surpluses and shortages by groups for the last period covered by the report and the charts show surpluses and shortages in 1907, 1908, 1909 and 1910.

Corn Production in the Land of Cotton.

The last report of the U. S. Department of Agriculture shows that in Virginia, North Carolina, South Carolina, Georgia, Kentucky, Tennessee, Alabama and Mississippi 26,277,000 acres were planted in corn this year, being an increase of 1,535,000 over 1909 and 2,776,000 acres over 1908. This points to the fact that the South is constantly devoting more attention to raising its own food supplies. The acreage in corn for the three years in these states is shown in the following table:

States.	1908.	1909.	1910.
Virginia	1,925,000	2,040,000	2,142,000
North Carolina	2,787,000	2,898,000	3,072,000
South Carolina	2,073,000	2,218,000	2,418,000
Georgia	4,300,000	4,400,000	4,532,000
Kentucky	3,366,000	3,568,000	3,639,000
Tennessee	3,350,000	3,575,000	3,718,000
Alabama	3,050,000	3,233,000	3,524,000
Mississippi	2,650,000	2,810,000	3,232,000
Total	23,501,000	24,742,000	26,277,000

The table indicates that each state showed an increase over 1908 in 1909 and an increase over 1909 in 1910. The condition of this year's crop as reported by the department shows the states of the South leading the country, Mississippi being first, Alabama second and Georgia third.

In a letter to the directors of the Southern Railway, President Finley called particular attention to these figures and said:

"The increase in the acreage of corn, accompanied, as it is, by a quite general adoption of improved cultural methods, is one of the most encouraging features of southern agricultural progress. It is one of the results of a general movement throughout the South in the direction of diversified agriculture—a movement which we are endeavoring to encourage and assist as far as we can properly do so."

As the farmers of the South increase their yield of corn, they will save enormous sums which they have been spending in the West for food products, and will consequently themselves realize more from cotton and other market crops.

Traffic Through the Soo Canals.

There was a total of 3,242 vessels passing through the United States and Canadian canals at Sault Ste. Marie in July, 1910. These vessels carried a total of 9,975,173 tons of freight, of which 5,552,240 tons, in 1,062 vessels, passed through the Canadian canal, and 4,422,933 tons, in 2,180 vessels, passed through the United States canal. Of the total tonnage passing through both canals, 7,510,236 tons was eastbound and 2,461,937 tons was westbound.

Calves Is Cattle.

The Chicago Great Western gives a special carload rate to farmers who want to move. They may use one end of a box car for their household goods and the other for their live stock *provided* they do not put in more than ten head. Not long ago a farmer availed himself of this rate. He locked ten cows in the car, but when it was opened it was discovered by the railway agent at the point of delivery that there were 12 head of cattle in the car, two of them new-born calves. Excess freight rates were demanded and paid by the farmer, who then registered a big kick with the higher freight officers of the road.

An agent of the company has asked the Interstate Commerce

Commission if the company might refund the extra charge to the farmer without violating the anti-rebate provisions of the law. The commission probably will decide that it can.—Special Washington despatch to the *Chicago Record-Herald*.

INTERSTATE COMMERCE COMMISSION.

Reparation Awarded.

Beekman Lumber Co. v. Louisiana Railway & Navigation et al. Opinion by Chairman Knapp.

Excessive charges resulted from misrouting. (19 I. C. C., 343.)

Former Ruling Adhered To.

American Creosote Works, Ltd., v. Illinois Central et al. Opinion by Commissioner Cockrell.

Defendants' petition for rehearing of this case denied. (19 I. C. C., 314.)

Rates on Cypress Lumber Found Unreasonable.

Freeman Lumber Co. v. St. Louis, Iron Mountain & Southern et al. Opinion by Commissioner Clark.

Rates from Gleason, Ark., to points in Missouri, Kansas, Illinois, etc., found unreasonable, and rates for the future prescribed. (19 I. C. C., 348.)

Through Routes Established.

Florida Cotton Oil Co. v. Central of Georgia et al. Opinion by Commissioner Harlan.

Through routes on cotton seed from points on the Central of Georgia to Jacksonville, Fla., prescribed and rates fixed. Reparation on certain shipments denied. (19 I. C. C., 336.)

Increased Rate Found Reasonable.

Ohio Foundry Co. v. Pittsburgh, Cincinnati, Chicago & St. Louis et al. Opinion by Commissioner Cockrell.

Tariff in force prior to January 1, 1909, provided rates of \$1.35 and \$1.45 per 100 lbs. on "iron fireplaces and grates for same." Effective January 1, 1909, rates increased to \$1.40 and \$1.50. Held, that the lower rates should apply on complainant's shipments.

Rate of \$1.40 not found to be unreasonable. (19 I. C. C., 65.)

Lumber Rate Reasonable.

Alabama Lumber & Export Co. v. Philadelphia, Baltimore & Washington et al. Opinion by Commissioner Harlan.

Defendants' rate on lumber from Bellamy, Ala., to Holly Beach, N. J., not found relatively unreasonable under the circumstances disclosed by record.

Whether the Sumter & Choctaw Railway ought to have been included as a proper or necessary party to this record, or whether it is a common carrier or a private carrier, not considered; the commission looks to the Southern Railway Company to fix its course with respect to this carrier in conformity with all the requirements of the law. (19 I. C. C., 295.)

Reparation on Express Rates Denied.

Joseph Ullman v. American Express Co. et al. Opinion by Chairman Knapp.

Original complaint herein alleged unreasonable rates, but did not ask for reparation. Defendants contend that if complainant desired an award of reparation he should have given notice to that effect in his original complaint, and having failed to do so should now be estopped from claiming damages upon shipments which moved prior to the filing of such complaint.

With this contention we are inclined to agree. As has been heretofore suggested, the commission is not disposed to try complaints by piecemeal. If a complainant desires to secure repara-

tion on traffic in respect of which he also seeks reduction of the rate for the future, we think he may reasonably be required to present his whole case at once. The commission enforces in its investigations only the most elementary rules of procedure, requiring merely that the complaint shall set forth concisely an alleged violation of the act. It is aimed to avoid technical rules which might impede the way to substantial justice, and to determine each case upon the merits alone. Obviously, however, it is in the interest of good administration that an entire case should be presented to the commission and to the defendants.

It does not follow, because the commission has found a rate unreasonable and established a lower rate for the future, that the former rate was unreasonable at all times in the past; and therefore, in such a proceeding as this, a second and independent investigation would be unavoidable. (19 I. C. C., 354.)

STATE COMMISSIONS.

The Railroad Commission of Louisiana has given permission to the Louisiana Railway & Navigation Co. to run its trains across crossings of certain logging roads and cane spurs without stopping.

The Railroad Commission of Louisiana has fined the Kansas City Southern \$100 for violating its rule that no switches, tracks or spurs in use in the state shall be removed or abandoned without consent of the commission.

The Railroad Commission of Louisiana has fined the St. Louis, Iron Mountain & Southern \$100 because the conductor and train porter of a passenger train refused to load the baggage of two commercial travelers without help. The travelers were forced to pay some one else to help the conductor and porter load their baggage into the baggage car.

The Railroad Commission of Ohio finds that the rate of 50 cents per ton for sand and gravel in carloads from Akron to Canton is unreasonable and establishes a rate of 30 cents. The rate of 45 cents per ton from Akron to Cleveland is found unreasonable and a rate of 40 cents is established. The rate of 90 cents per ton from Akron to Columbus is found reasonable.

The Kentucky commission has held unreasonable an increase in freight rates on grain and distilled and manufactured products made by the Louisville & Nashville on March 25, and ordered the rates which were in effect previously to be restored. It has also ordered the company to make reparation amounting to \$4,068 to 24 distilleries which were affected by the advance in rates.

The Railroad Commission of Ohio on complaint asking that the commission order the Toledo & Ohio Central to establish a station at Harley, finds that there was formerly a station at Harley and that the business to and from this station did

not justify the cost of keeping it up. The commission, therefore, refuses to order the establishment of a station, but suggests that a platform be built at Harley and that trains No. 1 and 10 make it flag stop and that Harley be made a prepaid station for L. C. L. freight shipments.

The Board of Public Utility Commissioners of New Jersey has refused, on the ground that it is without authority, to ratify the proposed agreement between the Pennsylvania Railroad and the Pennsylvania Tunnel & Terminal Railroad, providing for the operation of the tubes under the Hudson river. The commission held that while the law gave it authority to approve leases, it did not have authority to approve operating agreements. Apparently this will simply mean that the Pennsylvania tunnels will be operated without the formal approval of the New Jersey commission.

The New York Public Service Commission, Second district, has decided that under certain circumstances it is reasonable for a street railway company to charge more for a through trip than it charges for the sum of two local trips. The United Traction Co. operates the street railways of Troy and of Albany, and charges 5 cents for a ride from any point in Albany to any other point in Albany, and 5 cents a ride for any trip wholly within Troy. For a through trip, however, from any point in Albany to any point in Troy, 15 cents is charged. A passenger wishing to go from Albany to Troy can pay 5 cents and ride to the boundary between Albany and Troy; get out and take the next following car and pay 5 cents, going to any point in Troy, thus the sum of the two local trips is 10 cents, while if the passenger had made one through trip, he would have been charged 15 cents. This is not unreasonable, the commission holds, as long as the railway company treats all alike and does not help any one to evade the rule.

Proposed Changes in Railway Laws in Indiana.

The Indiana railway commission in its annual report recommends the following changes in the state laws affecting railways:

That the commission be empowered to intervene in proceedings for the location, change or extension of a public highway over the right-of-way of a railway outside the corporate limits of cities and towns, when, in its judgment, the proposed location or change would not be advisable from the standpoint of public safety.

That a uniform method be prescribed for presenting shippers' or consignees' claims against railways and fixing the kind of proof of claims which must be submitted. It is proposed also that a penalty be provided to compel carriers to make prompt settlements of claims.

That the commission be given authority to permit refunds or reparation where an authorized representative of a carrier has quoted to a shipper a rate lower than the lawful rate, whereby the shipper has suffered loss.

That the safety appliances law be amended to provide for

REVENUES AND EXPENSES OF EXPRESS COMPANIES.

FOR THE MONTH OF MARCH, 1910.
(Reported to the Interstate Commerce Commission.)

Name of company.	Express Companies.												United States.	Wells, Fargo & Co.	Western.
	Adams.	American.	Canadian.	Northern.	Globe.	Great Northern.	National.	North- ern.	Pacific.	Southern.	31,850	48,622	3,506		
Mileage of all lines covered: Rail lines	31,223	46,420	7,362	3,198	1,900	7,325	1,094	6,583	22,614	31,326	31,850	48,622	3,506		
Other lines.	8,241	1,278	2,792	22	....	211	148	261	608	1,639	611	4,994	4		
Operating revenues:															
Express \$2,796,270	\$8,063,766	\$189,511	\$31,154	\$40,845	\$205,180	\$95,769	\$276,575	\$722,987	\$1,367,330	\$1,667,454	\$2,220,087	\$57,046			
Mis. transportation														149	297
Nontransportation	16,000	119,060	3,980	1,155	491	1,226	326	3,893	10,209	17,607	21,368	40,213	783		
T't receipts, operatn.	2,812,270	3,182,826	198,442	32,309	41,335	206,407	96,095	279,967	733,196	1,384,938	1,688,822	2,260,449	58,127		
Express priv.—Dr.	1,451,450	1,445,312	100,109	12,462	20,421	82,973	35,818	184,934	348,517	676,184	794,295	1,055,148	21,667		
Total \$1,360,820	\$1,787,514	\$93,332	\$19,847	\$20,914	\$123,434	\$60,278	\$145,083	\$384,679	\$708,803	\$894,527	\$1,205,306	\$36,460			
Operating expenses:															
Maintenance \$51,471	\$122,830	\$8,550	\$266	\$1,012	\$1,142	\$662	\$568	\$10,005	\$16,593	\$41,265	\$46,452	\$607			
Traffic 6,970	27,716	702	210	564	769	....	2,026	6,418	7,149	13,223	15,289	1,600			
Transportation 936,101	1,201,323	68,790	9,693	13,421	49,134	42,914	69,044	218,527	395,670	689,568	759,653	19,488			
General 78,381	122,059	6,089	1,221	2,575	4,082	2,841	4,119	23,076	50,350	41,618	67,473	2,279			
Total \$1,072,928	\$1,473,928	\$79,131	\$11,399	\$17,572	\$55,127	\$46,419	\$75,756	\$258,027	\$469,762	\$785,674	\$888,867	\$23,974			
Net oprtg rev. or def \$287,898	\$263,585	\$14,201	\$8,448	\$3,342	\$68,306	\$18,859	\$69,277	\$126,652	\$289,041	\$108,854	\$316,439	\$12,486			
Taxes 13,164	19,960	1,150	180	500	2,432	29	3,500	4,948	10,084	20,870	20,632	433			
Operatg inc. or loss \$274,734	\$243,625	\$18,051	\$8,318	\$2,842	\$65,875	\$13,830	\$65,777	\$121,704	\$228,957	\$87,984	\$295,807	\$12,053			

adequate punishment for wrongful interference with the operation of appliances used to protect highway crossings.

That a statute be passed to punish all persons trespassing on railway tracks.

That the safety appliances law be further amended to require adequate and properly working hand-brakes on all cars, both freight and passenger, including interurban cars, and to give the commission authority to require the removal of lateral and overhead obstructions near railway tracks in cities and towns.

That the elimination of grade crossings be required, it being provided that steam and electric roads shall separate a specified number of grades each year for each 100 miles of road or fraction thereof, the expense of separation to be divided between the railways and the counties and cities or towns wherein the crossings are situated, on some basis to be fixed by the commission.

That town and city codes be so amended as to permit an appeal to the commission in respect to the regulations of town boards and city councils regarding the speed of trains within town or city limits.

That the two years' limitation on the life of orders of the commission be cut out of the law and a provision adopted that they shall remain in effect for such time as may be fixed by the commission itself or a court of competent jurisdiction.

Pennsylvania: Long and Short Haul Clause Upheld.

Coplay Cement Manufacturing Co. v. Lehigh Valley.

Complainant is a large manufacturer of Portland cement at Coplay, Pa., and uses annually about 40 or 50 thousand tons of coal. The coal is shipped from the Lehigh coal region over the Lehigh Valley Railroad about 22 miles, the freight rate being 90 cents per ton. The defendant carries exactly the same grade of coal from the same coal fields in the same direction to more distant points at Hokendauqua, Allentown and South Bethlehem, three-fourths of a mile, six miles and 11 miles further from the mines, for 55, 58 and 60 cents per ton. The complainant said that these charges violate the act of 1907, which prescribes that "persons and property transported over any railway shall be delivered at any station at charges not exceeding the charge for transportation of persons and property of the same class in the same direction to any more distant station." The defendant claims that it is not subject to the act of 1907, because its charter definitely states what charges it may make; moreover, it claims that even if it is subject to the act of 1907, the prohibition in question cannot be enforced because the service to the more distant points is under substantially dissimilar circumstances, since there is competition at these points. It also claims that the coal at the more distant points is used for a different purpose, and that the tariffs specifically provide for coal used only for these purposes. The commission finds that the railway company is amenable to the act of 1907 because its charter, rights and privileges are subject to amendment. The commission takes the long and short haul clause to mean exactly what it says, and since the defendant admits that it does charge more for a short haul of exactly the same kind of coal from the same mines than for a longer haul in the same direction, it is violating this act. The effort to make a distinction as to the class of freight taken to the furnaces and to the cement works on the ground of a difference in material manufactured by its use does not impress the commission. As well might it be said that the same grade of coal becomes a different class when used in a stove from what it is when used in a grate, or when used in a store from what it is when used in a dwelling. The commission [not having the power to order] recommends that the Lehigh Valley amend its tariffs to make them conform to the provisions of the long and short haul clause.

COURT NEWS.

The government has appealed to the supreme court in its case against the Baltimore & Ohio for maintaining an unreasonable obstruction in the Ohio river at Parkersburg, W. Va. In the northern district of West Virginia, Judge Dayton ordered a verdict of not guilty. The suit of the government was to enforce an order for removing a bridge pier from the channel of the river.

Railway Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

S. W. Brown has been appointed receiver of the Bartlett-Florence, with office at Georgetown, Tex.

Fairfax Harrison, vice-president of the Southern Railway at Washington, D. C., has been elected president of the Chicago, Indianapolis & Louisville.

H. D. Minor has been appointed assistant general solicitor of the Yazoo & Mississippi Valley, with office at Memphis, Tenn., succeeding C. L. Silvey, resigned some months ago to become general attorney of the Illinois Central.

Operating Officers.

George L. Bonney has been appointed superintendent of dining and sleeping cars of the Great Northern, with office at St. Paul, Minn., succeeding C. L. Pratt, resigned.

J. B. Farrell has been appointed a trainmaster of the Cincinnati, Hamilton & Dayton, with office at Indianapolis, Ind., succeeding D. Sullivan, acting trainmaster, who has been assigned to special duties connected with the improvement of the line, and whose headquarters will be at Dayton, Ohio.

W. A. Beerbower, engineer maintenance of way of the Denver, Northwestern & Pacific at Denver, Colo., has been appointed general superintendent, in charge of operating, engineering and maintenance departments, succeeding to the duties of W. A. Deuel, general manager, who has been given an extended leave of absence. The offices of G. R. Simmons, assistant general manager and purchasing agent, and H. A. Sumner, chief engineer, whose resignations have already been announced, are abolished, and all business formerly handled by the general manager, assistant general manager and purchasing agent and chief engineer should be addressed to the general superintendent.

Traffic Officers.

C. R. Miller has been appointed general baggage agent of the Western Pacific, with office at San Francisco, Cal.

W. J. Wells, traveling passenger agent of the Canadian Pacific at Brandon, Man., has been appointed a district passenger agent, with office at Nelson, B. C.

W. C. Dibblee has been appointed acting division freight and passenger agent of the Western Pacific, with office at Sacramento, Cal., in place of J. C. Havely, absent on account of ill health.

H. F. Ledlie, division freight agent of the Lake Shore & Michigan Southern, with office at Youngstown, Ohio, has resigned to become vice-president and general manager of the American Warehouse Company at Wichita, Kan.

L. F. McFarland, city passenger agent of the Wabash at Kansas City, Mo., has been appointed district passenger agent of the Chicago Great Western, with office at Kansas City, succeeding Frank L. Matthews, resigned to engage in private business.

F. H. Thompson, industrial agent of the Michigan Central at Detroit, Mich., has been appointed general agent, with office at Detroit, succeeding F. V. Davis, commercial agent, resigned. W. S. Crowl succeeds Mr. Thompson as industrial agent.

C. O. Williams, city passenger and ticket agent of the Kansas City Southern at Kansas City, Mo., has been appointed traveling passenger agent, with office at Kansas City, succeeding H. D. Dutton, resigned to accept service with the Kansas City, Mexico & Orient.

John F. Ryan, traveling freight agent of the New Orleans, Mobile & Chicago, at Memphis, Tenn., having resigned to go to another company, W. H. Askew, traveling freight and passenger agent at Laurel, Miss., is temporarily assigned to Memphis.

William Weston, general agent of the Denver, Northwestern & Pacific, having resigned, the industrial land and mineral department has been discontinued, and all matters pertaining to

this department will in future be handled by W. F. Jones, general traffic manager, Denver, Colo.

Alfred Hunt Rising, whose appointment as assistant general freight agent of the Southern Pacific, with office at San Francisco, Cal., has been announced in these columns, was born January 19, 1871, in San Francisco. He received a high school education and began railway work in November, 1883, with the Southern Pacific as a messenger boy. He remained in the local freight office at Los Angeles, Cal., until October, 1898, when he became a clerk in the general freight office. Six years later he was appointed district freight and passenger agent at Reno, Nev., and in October, 1905, he went back to the general freight office in San Francisco as chief clerk, from which position he has now been promoted.

Albion M. Fenton, whose appointment as assistant general freight agent of the Chicago, St. Paul, Minneapolis & Omaha at Minneapolis, Minn., has been announced in these columns, was born January 27, 1869, as Cresco, Iowa. He received a common school education and began railway work in 1886 with the Chicago, St. Paul, Minneapolis & Omaha as a telegraph operator. He continued as operator and agent at various places until 1898, when he was appointed a traveling freight and passenger agent, with headquarters at St. Paul. Two years later he was transferred to Grand Forks, N. D., and in 1901 he became general agent at Winnipeg, Man., where he remained until 1903. He was then for four years general agent at Helena, Mont., and from 1907 until his recent appointment he was division freight and passenger agent at Duluth, Minn.

Engineering and Rolling Stock Officers.

Alexander B. Todd has been appointed master mechanic of the Tonopah & Tidewater Co., which operates the Tonopah & Tidewater Railroad and the Bullfrog Goldfield Railroad, with office at Stagg, Cal.

C. E. Gossett, master mechanic of the Iowa Central at Marshalltown, Iowa, has been appointed master mechanic of the Minneapolis & St. Louis, with office at Minneapolis, Minn., succeeding J. Hill, resigned. William Hill succeeds Mr. Gossett.

W. A. Beerbower, engineer maintenance of way of the Denver, Northwestern & Pacific at Denver, Colo., has been appointed general superintendent, in charge of the operating, engineering and maintenance departments. (See an item under Operating Officers.)

C. E. Brinser, supervisor of the Pennsylvania Railroad, has been appointed division engineer of the New York, Philadelphia & Norfolk, with office at Cape Charles Va., and J. H. Martin has been appointed foreman of signals, with office at Pocomoke, Md.

A. J. Fries, division master mechanic of the Boston & Albany, at Springfield, Mass., has been appointed division superintendent of motive power of the Western division of the New York Central & Hudson River, with office at Depew, N. Y., succeeding C. H. Hogan, promoted.

OBITUARY.

Sidney B. Jones, for 30 years city passenger agent of the Chicago, Indianapolis & Louisville at Chicago, died of heart disease in Chicago on August 9. Mr. Jones has been in the service of the Monon since it was built.

C. L. Bretz, general manager of the Cumberland & Pennsylvania, died July 31 at Cumberland, Md. Mr. Bretz was born March 28, 1847, and began railway work in 1868 as a telegraph operator on the Pennsylvania Railroad. He was appointed general manager of the Cumberland & Pennsylvania on June 1, 1904.

T. A. Switz, formerly assistant to general manager and purchasing agent of the Minneapolis, St. Paul & Sault Ste. Marie, died August 13, at his home in East Orange, N. J. Mr. Switz was born November 15, 1857, at Madison, Wis., and began railway work in 1875 as telegraph operator on the Chicago, Milwaukee & St. Paul.

Paul S. Prendergast of St. Paul, Minn., engineer in charge of revision of line for the Great Northern, died at Great Falls, Mont., on August 9, at the age of 32 years. Mr. Prendergast was a graduate of the University of Minnesota and had been in the service of the Great Northern almost continuously since June, 1901, consecutively as leveler, transitman, assistant engineer of maintenance of way and construction, locating engineer, and then as engineer in charge of the important revision work between Armington, Mont., and Great Falls.

James E. Hurley, general manager of the Eastern Lines of the Atchison, Topeka & Santa Fe, vice-president of the St. Joseph Terminal Railroad and receiver of the Toluca, Marquette & Northern, at Topeka, Kan., died recently of heart disease at Carlsbad, Austria. Mr. Hurley was born June 1, 1860, at Wapello, Iowa, and went to the Wapello high school and later to the Normal School at Bloomfield, Iowa, for three years. He began railway work in 1880, and his whole career has been on the Atchison system, where he began as brakeman, and was a baggeman, telegraph operator and station clerk at various stations in Kansas; relief agent, and then chief clerk and cashier at Hutchinson. In October, 1883, he was made agent at Florence, and



James E. Hurley.

in 1887 became chief clerk to the general superintendent at Topeka. He was next appointed trainmaster of the Eastern division, remaining in that position until September, 1891, when he was appointed assistant superintendent of the Missouri division. The following month he was appointed assistant superintendent of the Chicago division. From June to October, 1894, he was superintendent of the New Mexico division, and was then made superintendent of the consolidated New Mexico and Rio Grande divisions. From January to October, 1901, he was acting general superintendent of lines west of Albuquerque, and was then appointed general superintendent of the Western Grand division, with office at La Junta, Colo. In July, 1902, he was appointed general superintendent of the Eastern Grand division, and in May, 1905, was made general manager of the same territory.

Albert Spies, who for many years was the editor of *Cassier's Magazine* and recently proprietor and editor of *Foundry News*, died of apoplexy on August 16 at his home in Jersey City, N. J. Mr. Spies was born in New York City July 20, 1862, and was a graduate of Stevens Institute. He was in engineering practice until 1893, when he became editor of *Cassier's Magazine*. He was vice-president, treasurer and managing director of Cassier's Magazine Company and vice-president of the Electrical Age Company until 1906, and then editor of the *Electrical Record*. Mr. Spies was a member of the American Institute of Mining Engineers, American Society of Mechanical Engineers, associate member of the American Institute of Electrical Engineers, and a member of the Engineers' club.

New Manager for Chilean State Railways.

Franz Doner, a German, has succeeded Huet, an Englishman, as general manager of the Chilean State Railways. This officer's power is only advisory, as he is not a member of the purchasing commission. The latter is composed of the director de la sección de materiales (at present James McCurdy, a Scotchman), the head of the particular department needing repairs or supplies, and the official in charge of expenditures for railways. It is almost impossible, however, for any firm not having a representative on the ground to get an order.

Railway Construction.

New Incorporations, Surveys, Etc.

BALTIMORE & OHIO.—A contract is said to have been given to the Eyre-Shoemaker Co., Philadelphia, Pa., to build a 10-mile line into the coal fields of Somerset county, Pa., from Somerset north to Acosta.

A contract is said to have been given to the McLean Contracting Co., Baltimore, Md., for the retaining walls and bridge abutments for the overhead crossings of the Baltimore & Ohio tracks at Hamburg street, Baltimore. The contract calls for about 5,000 yds. of concrete work. The contract for the steel superstructure will be let soon. This work is being carried out by the Baltimore & Ohio under the ordinance passed last year which provides for the elimination of grade crossings near the Camden station.

According to press reports a contract has been given for piercing a 4,500-ft. tunnel and building three miles of railway. The improvements will cost about \$2,000,000 and are being carried out to eliminate an old tunnel at Tunnelton, W. Va.

BATESVILLE SOUTHWESTERN.—Incorporated in Mississippi, with \$100,000 capital, to build from Batesville, Miss., on the Illinois Central, south to Charleston, in Tallahatchie county, 28 miles. The line will traverse a rich agricultural and timber section. The promoters are identified with the Illinois Central. R. J. Darnell, Memphis, Tenn., is also interested.

BOSTON & ALBANY.—Work is shortly to be begun on the new tunnel between State Line, Mass., and Canaan, N. Y. This tunnel will be 1,200 ft. long and will be virtually a duplicate of the present two-track tunnel, thus making possible the four-tracking of the road at this point. (June 17, p. 1567.)

BROWNWOOD NORTH & SOUTH.—According to press reports, the Texas Grading Co., Fort Worth, Tex., will complete grading work on this line from Brownwood, Tex., north to May, during August, and track laying is to be started by September 1. (July 29, p. 205.)

CANADIAN NORTHERN.—According to press reports, application has been made to the Dominion government for a charter to build from Edmonton, Alb., west to Stewart, B. C.

Engineers are now at work, it is said, seeking a practicable pass for the Portland Canal short line, to be built under the name of the Pacific & Alaska eastward from the headwaters of the Salmon river towards the eastern boundary of the province to a connection with the main line at a point west of Yellow Head Pass.

The Carlton subdivision, extending from Dalmeny, Sask., north to Laird, 28 miles, of this road has been opened for business.

CANADIAN PACIFIC.—According to press reports, this company has concluded negotiations for buying nearly a mile of river front property at Kamloops, B. C., on the North Thompson river. This is to be used as a site for yards and increased terminal facilities. The total cost of the improvements will be about \$200,000.

CLARION & EAST BRADY (ELECTRIC).—It is announced that a contract will be let by September 1 for building this line from Clarion, Pa., southwest to East Brady, 31 miles. The road will connect with the Franklin & Clearfield at Reidsburg. It is understood that the line is to be completed by July 1, 1911.

CONNECTICUT RIVER RAILROAD.—Application has been made to the Massachusetts Board of Railroad Commissioners to build an extension within the limits of the city of Chicopee, Mass., from a point on the company's right-of-way, about one-third of a mile east of the Chicopee Center station, on its Chicopee Falls branch, northeasterly and easterly about a mile and a half to a point near Gratton street. The work will involve the excavation of 34,000 cu. yds., the construction of 800 cu. yds. of masonry and putting up a bridge over the Chicopee river.

DES CHUTES RAILWAY.—An officer is quoted as saying that an extension is to be built from Redmond, Ore., southward to connect with the Natron-Klamath Falls line now being built under the name of the Oregon Eastern. (Jan. 28, p. 209.)

EASTERN ILLINOIS (ELECTRIC).—This company is said to have

given a mortgage to secure an issue of \$5,000,000 bonds, of which \$400,000 are to be used for securing property and building and equipping the line. The company was organized in Illinois early this year and plans to build a line from West Hammond, Ill., west via Harvey and Riverdale to the Chicago city limits. T. E. Mitten, of the Chicago City Railways, is president. (March 18, p. 750.)

ERIE.—An officer writes that work is to be continued until stopped by extremely cold weather by the company's men making improvements through Jamestown, N. Y., rearranging the main tracks, providing switching leads for industrial tracks, and enlarging the freight house yards. Work is also being carried out at Kent, Ohio, rearranging and enlarging the division yards.

FAIRCHILD & NORTHEASTERN.—This company has amended its charter, permitting it to build an extension from Fairchild, Wis., west to a point on the Chicago, Milwaukee & St. Paul near Caryville, in Dunn county, about 40 miles. The line is now in operation from Fairchild, northeast to Owen, 38 miles. (June 17, p. 1568.)

GREAT NORTHERN.—An officer writes that plans are being made for a change of line on the main line west of Wellington, Wash., which involves the construction of a reinforced concrete snow shed.

GREENVILLE & KNOXVILLE.—This road has been extended from Cleveland, S. C., north to Riverview. (March 19, 1907, p. 654.)

HUDSON & MANHATTAN.—An officer is quoted as saying that work is being pushed on the Sixth avenue extension and that the Thirty-third street terminal station is expected to be finished and opened for operation about November 1. The Twenty-eighth street station will be finished about the same time. The extension to Forty-second street and connection with the train levels of the new Grand Central station it is expected will be completed within the three-year limit. (April 22, p. 1065.)

HUDSON BAY RAILWAY.—The government has not yet decided what action it will take in connection with carrying out the work of building this line from the present terminus of the Canadian Northern line at The Pass, Keewatin, north to Hudson bay. It is understood that the Canadian Northern is willing to build the line, but it is thought that the government will carry out the construction work and lease the line to the Canadian Northern. (July 8, p. 107.)

JOHNSTOWN & ALTOONA (ELECTRIC).—An officer writes that bids have been received and are under advisement for building the line from South Fork, Pa., northeast to Altoona, 30 miles. (July 29, p. 205.)

LAKE GENEVA & LAKE DELAVAN.—Incorporated in Wisconsin, with \$25,000 capital and office at Walworth, Wis. The incorporators include: H. T. Windsor, L. C. Church, L. K. Robar and H. H. Lawrence.

LEHIGH VALLEY.—The report of this company for the year ended June 30, 1910, under date of August 10, shows that the company carried out a number of improvements and betterments during the year. The construction of a single-track branch from Lumber Yard, Pa., to a connection with the main line at Hays Creek, 12 miles, with the necessary classification yard, engine house, shop for car repairs and fuel and water facilities, to cost about \$1,500,000, has been authorized. The new line will provide a shorter route for westbound traffic from the Mahanoy and Hazleton regions and the classification of coal shipments in the vicinity of the mines, thus avoiding the congestion at Packerton and the reverse movement at Penn Haven Junction. Final surveys are now being made preliminary to the active construction of the branch. Surveys are also being made for double-tracking the line between Laurel Junction and Silver Brook Junction, six miles. The work of extending third and fourth tracks through congested territory has been actively continued. Extensions from Redington to Richards Farm, 1.91 miles, and from Gap Junction to a point west of Fullerton, including a change of alignment, 1.38 miles, have been finished. A further extension from Fullerton to Cementon, 4.29 miles, is in course of construction. In extending the four-track system through South Bethlehem improvement in the alignment is being made by eliminating a sharp reverse curve in the main line. An extension was also made to the fourth track from Park avenue, South Plainfield, N. J., to Potters, two miles, and in connection

with this work 1.25 miles of the line east of Potters was raised a maximum of 8 ft., effecting a considerable reduction in the grade. A receiving track, 2.4 miles long, was constructed at the west end of Perth Amboy yard and four additional tracks were laid. Revisions of line were made, eliminating sharp reverse curves, at Meshoppen, Pa., and Kittredge. Additional tracks were constructed at the Tiff Farm, N. Y., terminal, and work has been finished on the new high grade line at Greenville, N. J. During the year six new steel bridges were built, 28 steel bridges and 10 concrete steel bridges were put in to replace light iron or wooden structures, and 11 small bridges were replaced by pipe culverts. Eight bridges were abandoned and the openings filled, and three wooden overhead highway bridges were replaced by steel bridges and one removed. On the Auburn and Ithaca branch the bridges have been removed and strengthened to carry heavier rolling stock. See report elsewhere in this issue.

LOUISVILLE & NASHVILLE.—According to press reports, this company is planning to carry out double-track work between Birmingham, Ala., and Decatur.

MEXICAN ROADS.—Grading work will probably be started on the line between Monclova, Coahuila and Chihuahua, 410 miles, some time this fall. The state of Chihuahua is said to have granted a subsidy of \$400,000 in aid of the enterprise, and also a liberal subsidy aggregating nearly \$2,000,000 on that portion of the road between Monclova and the Chihuahua state line. It is also reported that assurances have been given by the general government that it will also contribute liberal aid in the way of bonds. (March 4, p. 461.)

MILWAUKEE & FOX RIVER VALLEY (ELECTRIC).—The Wisconsin State Railway Commission has granted this company a certificate of convenience and necessity for the proposed line from Milwaukee, Wis., to Fond du Lac, passing through Hamilton, Cedarburg, Newberg, Plymouth, Chilton, Stockbridge, Appleton, Kaukauna and Menasha.

MISSOURI PACIFIC.—A contract has been given to the Hodges-Downey Construction Co., St. Louis, Mo., by the St. Louis, Iron Mountain & Southern, for the filling of about 20 trestles, involving the handling of about 460,000 yds. on the line between McGehee, Ark., and Helena.

NATIONAL RAILWAYS OF MEXICO.—An officer writes that contracts have been given to Bell, Semmes & Blackford, Morelia, Michoacan, Mexico, for realinement work, reducing the grades and changing the narrow gage line to standard between Acambaro and Andocutin; also between Morelia and Lagunillas. There will be some short girders and many masonry culverts. (July 29, p. 209.)

OREGON RAILWAYS (ELECTRIC).—According to press reports, financial arrangements have been made and rights-of-way are to be secured at once for an electric line from Oregon City, Ore., south through the Molalla valley. G. C. Fields, Oregon City, is said to be the principal promoter.

PACIFIC & ALASKA.—See Canadian Northern.

PECOS VALLEY SOUTHERN.—According to press reports, track laying has been finished from Pecos, Tex., south to Saragosa, 30 miles, and this section is now open for freight and passenger business. The line is eventually to be extended further south via Balmorhea to San Salmon. L. W. Anderson, chief engineer, Pecos. (July 8, p. 104.)

PEOPLES RAILWAY.—An officer writes that this company is building from New Hamburg, Ont., east to Guelph, 29 miles, and contracts are let as follows: F. W. Maxwell, Port Hope, for work on three miles of the main line from Berlin, Ont., east to Bloomingdale, the work to be finished by December 1; R. B. Campbell, Latchford, for the section from Berlin, westerly to New Hamburg, 14 miles; this work is to be finished by December 30. The Acme Construction Co. has been at work for the past month carrying out the grading work from Bloomingdale east to Guelph. It is expected that the grading will be finished from Bloomingdale east to New Germany soon, and on the entire line by December. A contract has been given to Thomas Robbins, Galt, for all the concrete work on the line, including the three large piers and two abutments for the Grand river east of Berlin; the work is to be finished by December 1. A large force of engineers will at once make surveys

from Guelph north via Elora and Fergus to Arthur, as well from Guelph south to Puslinch lake. An extension is also projected west. The company expects to have most of the line in operation by July, 1911, and to complete a total of about 80 miles during 1911. A. N. Warfield, Berlin, may be addressed.

ST. LOUIS & EASTERN TRACTION.—Incorporated in Illinois to build from Granite City, Ill., east through Madison and Bond counties to Greenville, about 50 miles. The office of the company is at Greenville. The incorporators include: A. W. Crawford, C. C. Hillsboro and C. C. Terry, Girard.

ST. LOUIS & SOUTHEASTERN.—Organized in Missouri, with \$700,000 capital, to build a line to connect Cape Girardeau, Mo., with the St. Louis & San Francisco, in New Madrid county, about 75 miles. E. S. McCarty, president and general manager; L. A. Lewis, W. H. Garanflow and A. B. Hunter are vice-presidents; D. R. Hunter, treasurer, and L. Hunter, secretary.

ST. LOUIS, IRON MOUNTAIN & SOUTHERN.—See Missouri Pacific.

SAN ANTONIO, RIO GRANDE & TAMPICO.—Press reports from Austin, Tex., say that the engineer of the Railway Commission has completed his preliminary valuation of this work. He estimates the cost of the proposed line at \$1,688,361, an average of about \$18,655 per mile. (May 27, p. 1325.)

SOUTHERN PACIFIC.—Press reports indicate that the new trestle, three-quarters of a mile in length, on the western end of the Lucin cut-off over the Great Salt lake, has been opened for traffic. (April 1, p. 919.)

SPRINGFIELD & WESTERN INTER-URBAN.—An officer writes that this electric line is to be built from Springfield, Mo., north and west to Nichols, thence west to Carthage and Joplin, with a branch from Paris Springs south through Mt. Vernon, Friedstadt and Monett to Pierce City, and another branch from North Springfield south to meet the other line between Springfield and Nichols. Contracts for grading, track laying, bridges, etc., will be let early in 1911. There will be one 2,000-ft. trestle. M. M. Hollinbeck, president and chief engineer, Springfield.

TWIN CITY & LAKE SUPERIOR (ELECTRIC).—An officer writes regarding the double-track, third-rail line from Minneapolis, Minn., via St. Paul and Superior, Wis., to Duluth, Minn., 130 miles, that a portion of the grading has been completed and that no new contracts will be let for about 60 days. The work on this line is not of a difficult nature, the cut and fill per mile averaging 6 ft. There will be a few grades of 1 per cent. maximum, and the maximum curves will be 3 deg. There will be about eight or ten steel bridges, the longest being 1,400 ft. There will be 20 substations along the line. L. N. Loomis, president; H. L. Laughlin, chief engineer, Minneapolis. (March 19, 1909, p. 658.)

TEXAS ROADS.—Engineers are now at work locating the route for a line to be built from Longview, Tex., to the iron ore fields in Cass county, about 40 miles. The line is to be built by L. F. Featherstone and associates of Galveston, and it is understood is being backed by the Santa Fe. Surveys are also being made for a line to connect the iron ore fields with the Missouri, Kansas & Texas, about 20 miles.

VERA CRUZ, TOBASCO & CAMPECHE.—The construction company which is locating the route for the proposed line from Santa Luceria, state of Oaxaca, Mex., east and north to Campeche, in the state of the same name, 490 miles, will, it is reported, also build a branch line to the port of Coatzacoalcos, Vera Cruz, which is the Atlantic terminus of the Tehuantepec National. The proposed branch will be about 50 miles long and will traverse one of the richest tropical regions in Mexico. It is said that the federal government, in view of the proposed early building of this line, has abandoned its plans for spending several million dollars in improving the labor at Frontera, Tobasco. The new line will afford an outlet for the products of that region and there will be little necessity for using Frontera as a shipping point. (June 17, p. 1568.)

WASHINGTON RAILWAYS (ELECTRIC).—Financial arrangements are said to have been made and right-of-way secured for an electric line from Chehalis, Wash., west to Randle, in Lewis county, about 55 miles. C. L. Wilson and W. H. Allen, Chehalis, are interested.

Railway Financial News.

BARTLETT-FLORENCE.—The property of this company, which consists of 11 miles of road in operation from Bartlett to Jarrell, and 15 miles of partly graded road from Jarrell to Florence, has been placed in the hands of S. W. Brown as receiver.

CANADIAN NORTHERN.—An agreement, dated May 9, 1910, for the merger of the Saskatchewan Midland with the Canadian Northern has been filed with the Secretary of State, Canada, and sanctioned by the governor-general. See also Quebec & Lake St. John.

CANADIAN NORTHERN ONTARIO.—This company has bought \$2,463,300 stock of the total outstanding \$2,650,000 of the Ontario & Ottawa Railway, which company controls the Irondale, Bancroft & Ottawa, the Central Ontario and the Marmora Railway.

CANADIAN PACIFIC.—See New Brunswick Railway.

CENTRAL ARKANSAS & EASTERN.—See St. Louis Southwestern.

CENTRAL NEW ENGLAND.—Minority stockholders have deposited their stock in sufficient quantities to make the negotiations with the New York, New Haven & Hartford for the sale of this stock a success, and the National Bank of Northern Liberties, Philadelphia, is making payment on all stock deposited up to July 25. The bank will continue to receive deposits of stock until November 1. (July 22, page 175.)

CHESAPEAKE & OHIO.—The Chesapeake & Ohio Equipment Corporation, recently organized, has filed an equipment trust agreement covering rolling stock that cost \$5,595,000 to secure \$4,800,000 series A and B 5 per cent. one-year equipment notes dated July 1, 1910. This is the equipment issue that the company does not expect to sell at present. The equipment securing series A notes consists of 3,000 fifty-ton all-steel hopper cars, 500 forty-ton steel frame box cars and eight all-steel cars for passenger service. The equipment securing the series B notes, all of which is now in use, consists of 1,000 all-steel center dumping hopper cars, 400 double-bottom all-steel cars and 1,000 all-steel hopper cars.

DELAWARE & EASTERN.—The reorganization committee, C. C. Taylor, secretary, Pittsburgh, Pa., asks bondholders of the Delaware & Eastern to communicate with the committee, as the mortgage securing the \$1,000,000 bonds is to be foreclosed.

DETROIT, TOLEDO & IROTON.—A reorganization committee has been formed representing holders of consolidated mortgage 4½ per cent. bonds. The committee consists of General Alvin Young, chairman; Strathearn Hendrie, F. Ross Williams, Benson Foraker, G. W. Young, G. H. Worthington, Francis Henderson, James J. Robison, Warren W. Foster, with Howard C. Dickinson, 26 Exchange place, New York, as secretary.

GRAND TRUNK.—The directors, in addition to the full dividends on the guaranteed 4 per cent. stock and on the first preference stock, have declared a dividend for the half year ended June 30 of 2½ per cent. on the second preference stock. In 1909 and 1908 no dividends were declared in the first half of the year. In the second half of 1908 2½ per cent. was paid and in the second half of 1909 5 per cent. was paid to cover the entire year of 1909.

INTERNATIONAL & GREAT NORTHERN.—Sale of the property under foreclosure has been set for September 15. The reorganization of the property will probably take place under the third mortgage, the holders of which securities are expected to buy in the property. The Goulds own \$1,965,000 of the third mortgage bonds out of a total issue outstanding of \$2,965,000.

LEAVENWORTH TERMINAL RAILWAY & BRIDGE.—The Chicago Great Western has bought the entire \$600,000 stock of this company, but has not guaranteed the \$600,000 bonds. The Terminal company owns the highway and railway bridge, 1,110 ft. long, over the Missouri river at Leavenworth, Kan., and also the terminal property in Leavenworth.

MONTEREY, FRESNO & EASTERN.—The supreme court of Califor-

nia has granted a delay in the sale of this property. The property was placed in the hands of Edward White, as receiver, in 1907. About six miles of the road from Watsonville to Monterey were operated for a short time. The rest of the property consists of real estate, rolling stock, power houses, warehouses, etc., and the total is said to be worth about \$2,000,000.

NEW BRUNSWICK RAILWAY.—The company has declared a dividend of 4 per cent. on its \$3,000,000 stock for the year ended June 30. This is an increase of 1 per cent. over the previous years. The road is operated under lease by the Canadian Pacific.

NEW YORK, NEW HAVEN & HARTFORD.—See Central New England.

NORFOLK & WESTERN.—At a meeting to be held October 13 stockholders are to vote on the question of authorizing an increase in the common stock of \$50,000,000, making the total authorized common stock \$150,000,000. Of the present authorized \$100,000,000 common about \$69,000,000 is outstanding and all of the authorized \$23,000,000 4 per cent. non-cumulative preferred is outstanding. Stockholders are also to vote on the question of authorizing \$50,000,000 bonds, to be convertible into common stock on a basis to be determined by the directors. It is said in a letter sent to stockholders by President Johnson that no sale of the common stock or bonds is contemplated at the present time, but that it is the purpose of the directors to give the stockholders an opportunity to subscribe to any securities that may be hereafter issued. The issue of bonds is limited in amount to the amount of new stock held for the purpose of conversion. It is evident, therefore, that it will only be possible to increase the total capitalization of the company by \$50,000,000.

Stockholders will also vote on the question of approving a proposal to acquire by purchase, consolidation, merger or lease the property of the Big Stony Railroad, and also to lease the property of the Norfolk Terminal Railroad.

PENNSYLVANIA RAILROAD.—The New York Stock Exchange has listed \$12,750,000 additional Allegheny Valley Railway general mortgage 4 per cent. bonds, due 1942. Of these bonds, \$10,000,000 were issued to retire a like amount of Allegheny Valley Railroad low-grade-division first mortgage 7 per cent. bonds, due April 1, 1910, and \$2,750,000 were issued to pay for double track work, extension of yards and for additional real estate.

ST. LOUIS SOUTHWESTERN.—Stockholders are to vote October 4 on the question of ratifying the agreement to guarantee principal and interest on the first mortgage 5 per cent. bonds of July 1, 1910-1940, of the Stephensville North & South Texas; also on the question of guaranteeing payment of principal and interest on the first mortgage 5 per cent. bonds of July 1, 1910-1940, of the Central Arkansas & Eastern; also on the question of leasing the Central Arkansas & Eastern for 30 years, during which time the St. Louis Southwestern is to have an option on the property to take it over on assumption of the payment of all bonds. The Central Arkansas & Eastern operates a line from England, Ark., to McGregor, 9½ miles, and in February, 1910, increased its authorized capital stock from \$100,000 to about \$800,000, and proposes to build a line from McGregor to Stuttgart, 15 miles.

UNDERGROUND ELECTRIC OF LONDON.—An initial dividend of half of 1 per cent. has been declared on the income bonds for the half year ended June 30, 1910.

WABASH-PITTSBURGH TERMINAL.—The United States circuit court has given the receivers permission to bring a suit against the Wabash and the Wheeling & Lake Erie for an accounting under the traffic and trackage agreement by which the Wabash and the Wheeling & Lake Erie pledged 25 per cent. of their gross earnings from traffic interchanged to the Terminal company to meet any deficiency of interest on the Terminal company's bonds.

The German freight tariff has received a supplement which provides that when flying machines, dirigible balloons and the like are shipped, an attendant may accompany them in the baggage wagon, paying 2 pfennigs per kilometer.

Supply Trade Section.

The W. S. Tyler Company, Chicago, has moved its offices from 800 Railway Exchange building to 701 Harvester building.

E. H. Symington has been appointed mechanical expert of the T. H. Symington Co., Baltimore, Md., with headquarters at Chicago.

The Damascus Brake Beam Company will open a plant in Cleveland, Ohio, soon to replace that which was burned a few weeks ago at Sharon, Pa.

The Safety Foot Guard & Railway Appliance Company, Columbus, Ohio, has been incorporated with a capital stock of \$10,000. The incorporators are H. D. Ridenour and others.

The Kellogg Switchboard & Supply Co., Chicago, has been made exclusive agent of the United States Electric Co., New York, for the sale of railway telephone equipments, including the Gill selector.

The Marion Shovel & Dredge Company, Marion, Ohio, has been incorporated with a capital stock of \$400,000. The incorporators are J. D. Owens, Arthur E. Cheney, B. W. Evans, C. A. Owens and H. J. Barnhart.

W. M. Lalor has resigned as manager of the railway department of the United States Light & Heating Company, New York, to accept the position of sales engineer with the Gould Coupler Company, Depew, N. Y., with offices in Chicago.

The Hodges-Downey Construction Company, St. Louis, Mo., has received a contract from the St. Louis, Iron Mountain & Southern for the filling of about 20 trestles, approximately 460,000 yards, on the line between McGehee, Ark., and Helena, Ark.

The Mexican Northwestern has recently placed a large order for motors with the Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., including 160 induction motors, aggregating 3,736 h.p., of the types MS and HF, ranging from 3 to 200 h.p. each. These motors will be shipped to Madera, Chihuahua, Mex., to be used in the operation of the saw and planing mills.

William H. Silverthorn, president and a member of the executive committee of the Railway Steel-Spring Co., New York, died at his home in Painesville, Ohio, on the morning of August 13, 1910. Mr. Silverthorn, or "Silver" as he was familiarly known to a host of friends, was identified with the railway supply business for many years. For the last 36 years, which period ended on the day of his death, Mr. Silverthorn was associated with Julius E. French, now chairman of the board of the Railway Steel-Spring Co. Those who knew Mr. Silverthorn well will recall that his first work in the railway supply field was with the old Paige Car Wheel Co., of which he was general manager. This concern was, in 1897, consolidated with a number of other

makers of wheels into the Steel Tired Wheel Co., and Mr. Silverthorn became a director and general manager. The Railway Steel-Spring Co. was incorporated in February, 1902, and acquired the plants of several makers of springs for railway service, among them the A. French Spring Co., with which Mr. Silverthorn had been identified for a number of years. In June of that year the Steel Tired Wheel Co. was merged into the Railway Steel-Spring Co., and Mr. Silverthorn was elected a director, and, later, vice-president and a member of the executive committee. In March, 1906, he succeeded Julius E. French as president of the company. Mr. Silverthorn at the time of

his death was also president of the United States Light & Heating Co., and a member of the board of directors of the Casualty Co. of America, the Chicago-Cleveland Car Roofing Co., and the United States & Mexican Trust Co., as well as the Railway Steel-Spring Co., and United States Light & Heating Co. Mr. Silverthorn was buried at Cleveland, Ohio, on August 16.

TRADE PUBLICATIONS.

Springs.—The Pittsburgh Spring and Steel Co., Pittsburgh, Pa., has issued a catalogue covering the elliptic and coil springs for locomotives, passenger, freight, traction and interurban cars which it manufactures.

Locomotive Firebox.—The Wm. H. Wood Loco. Fire-Box & Tube Plate Co., Media, Pa., has issued a mailing card, showing a side elevation of a locomotive boiler having a Wood's patent firebox and tube plates.

Diamond Steel Pole.—The 1910 catalogue of the U. S. Metal & Manufacturing Co., New York, describes the diamond steel pole for use on electric power lines, telegraph and telephone lines, signal, danger and semaphore posts.

Link Belt Machinery.—Catalogue No. 90 of the Link-Belt Company, Chicago, containing 400 pages, 6 in. x 9 in., cloth bound, has just been issued. This catalogue is devoted particularly to price lists, illustrations and dimensions of the standard articles manufactured by this company, showing only a few general illustrations that are typical of its large engineering installations.

Steel Car Paint.—The Joseph Dixon Crucible Company, Jersey City, N. J., has just issued a very attractive booklet of envelope size on paint for steel cars, which illustrates a number of different types of steel cars upon which Dixon's paint has given excellent service. The booklet also contains color chips showing the four colors in which Dixon's Silica-Graphite steel car paint is made.

Glue Heaters.—The Advance Machinery Co., Toledo, Ohio, has just issued its 1911 catalogue, which supersedes all glue heating catalogues heretofore issued by this company. This one describes 56 different types of glue heaters, made in all sizes from 1 pt. to 500 gals., for use in heating glue, paraffine, starch, gelatine, dextrine, paste and gum, using the following heating agents: Oil, gasoline, gas, steam and electricity.

Brake Operation and Manipulation.—A reprint of a paper entitled "Brake Operation and Manipulation in General Freight Service," given by W. B. Turner, chief engineer, before the Western Railway Club, Chicago, on December 21, has been made up in pamphlet form by the Westinghouse Air Brake Co., Pittsburgh, Pa. This paper is a development from, and an elaboration of, the discussion along this line at the convention of the Traveling Engineers' Association held in Denver, Colo., a year ago.

Electrical Supplies.—The General Electric Co., Schenectady, N. Y., has issued bulletin No. 4718, illustrating and describing all of the apparatus required for a complete series incandescent lighting system; bulletin No. 4750 on standard couplings adapted for coupling electrical apparatus together or to other machinery; bulletin No. 4752 on rectifier sets, luminous arc lamps and all necessary auxiliary apparatus for complete series luminous arc rectifier systems, and bulletin No. 4760 regarding a line of direct-current instruments, constructed upon the D'Arsonval principle and designed for switchboard use.

Car Heating and Lighting.—A 165-page catalogue, 9 x 12 in., has been published by the Gold Car Heating & Lighting Company, New York, the intention being to include in one volume all of the various devices, fittings and special fixtures connected with the Gold systems of steam, vapor, hot water and electric heating so that they may readily be identified when ordering complete outfits or repair parts. Diagrams show the general arrangement of the apparatus on the car or locomotive, while detail drawings and illustrations show each of the various parts; they are numbered for convenience in ordering. The



William H. Silverthorn.

Gold improved storage system for heating refrigerator cars is described; also Gold's cyclone ventilator for passenger and refrigerator cars and Gold's improved system of acetylene car lighting.

RAILWAY STRUCTURES.

AMERICAN FALLS, IDAHO.—It is said the Oregon Short Line is having plans made for a new steel bridge over the Snake river. The estimated cost is \$400,000.

BALTIMORE, Md.—See Baltimore & Ohio under Railway Construction.

BOSTON, MASS.—Plans for the subway station for the Cambridge subway, at Park street, have been made and bids will be asked for soon to carry out the work. The station will be under the present Park street station, with which it will be connected by six stairways. The section of the tunnel under Beacon hill, which was begun last September from a point northwest of Grove and Phillips streets, towards the Park street station, is finished to a point under Mount Vernon street, and it is expected that this section will be finished by January. The Cambridge part of this tunnel is being built by private contractors for the Boston Elevated Railway Co. and the part within Boston's municipal limits is being done by the Boston Transit Commission.

CHICAGO.—The Illinois Central is having plans prepared for a proposed new station at the foot of Monroe street. The estimated cost of the building is \$50,000.

CHICOPEE, MASS.—See Connecticut River Railroad under Railway Construction.

EDMONTON, ALB.—The Canadian Pacific has given a contract to John Gunn & Sons, Winnipeg, Man., to build the substructure of a bridge over the North Saskatchewan river.

FORT WORTH, TEX.—The Missouri, Kansas & Texas is said to have started work on a reinforced concrete bridge, to carry two tracks, over Hattie street, in Fort Worth.

HOUSTON, TEX.—The new union terminal station built by the Houston Belt & Terminal Co. at Texas avenue and Crawford street in Houston, was formally opened for traffic on August 10. (March 11, p. 464.)

JAMAICA, N. Y.—Work is now under way by the Long Island Railroad Company's men on the new station and office building at Jamaica. Some contracts will be let about September 20. The building will be of fireproof brick construction, three stories high, 70 ft. x 175 ft., and will cost about \$325,000. (Aug. 5, p. 265.)

KANSAS CITY, Mo.—The Kansas City Terminal Company has given a contract to C. D. Smith & Co., Memphis, Tenn., to excavate the site for the new union station. There are 750,000 cu. yds. of earth to be removed and the work is to be completed by May 1, 1911.

MATAMORAS, MEX.—According to press reports the new railway bridge over the Rio Grande, built jointly by the St. Louis & San Francisco and the National Railways of Mexico, cannot be placed in use until the latter company extends its line from the present terminus in Matamoras to the bridge connection, about two miles. This work is held up by legal action on the part of a street railway, which objects to the crossing of its line.

SHEBOYGAN, WIS.—The Sheboygan Light, Power & Railway Co. is said to be making plans for a new car barn to be built at Sheboygan, at a cost of \$25,000.

SIR JOHN'S RUN, W. VA.—The Baltimore & Ohio has given a contract to Roberts & Schaefer Company, Chicago, to build a coaling station to cost \$25,000.

SPARKS, NEV.—The Southern Pacific will build an addition to the shops here. The building will be two stories high, 60 x 100 ft., and will be made of brick.

TACOMA, WASH.—The Chicago, Milwaukee & Puget Sound is to build a commissary.

WINNIPEG, MAN.—The Canadian Northern has given a contract to the Carter-Halls-Aldridge Company to build coach shops, to cost \$42,000.

Late News.

The items in this column were received after the classified departments were closed.

A press despatch from Columbia, S. C., says that the Southern Railway train No. 30 southbound is reported as having been derailed near Rockton and 15 persons have been injured. The despatch says that the mail, express and combination cars and two passenger coaches were overturned, but the three sleepers remained upright.

William P. Boland, an independent coal operator of Scranton, Pa., has filed with the Interstate Commerce Commission charges against the Delaware, Lackawanna & Western and a number of other roads, charging that these railways and the Temple Iron Company have been engaged in a conspiracy to drive the complainant out of business.

Protesting against an assessment of \$3,835,448 by the California Board of Equalization, officers of the San Pedro, Los Angeles & Salt Lake say that last winter's loss of 100 miles of track cost the company about \$6,000,000 earnings and \$4,000,000 physical damage. Gross earnings for the fiscal year 1909 were \$7,450,462, of which California tonnage provided \$2,296,977. The assessment will be reconsidered September 3.

W. G. Lee, chief of the Brotherhood of Railroad Trainmen, is quoted as saying that the final terms of the Pennsylvania Railroad wage scale adjustment give the trainmen the mileage and per diem rates in force on the New York Central and the Baltimore & Ohio wherever the Pennsylvania rates were lower than those of the New York Central, and the Pennsylvania rate has been maintained wherever it was higher than the New York Central.

The final award of the arbitrators in the settlement of the wage dispute between the Southern Railway and its telegraph operators has been filed in the district court in accordance with the Erdman law. The award provides for an increase in wages amounting to 8 per cent. and 15 days' vacation with pay for employees in service more than two years. It also provides for a working day of 10 hours where two telegraph operators are employed, and where three or more telegraphers are employed the working day is fixed at nine hours.

The Long Island Railroad has filed a passenger tariff with the New York Public Service Commission, showing the rates which will be in force to Manhattan when trains begin running through, on September 8. A charge of five cents will be made from Long Island City to the Seventh avenue station of the Pennsylvania Railroad. This is two cents higher than the present ferry rate from Long Island City to the foot of Thirty-fourth street and the East river, and since the majority of people take a street car on the Manhattan side to get to the shopping district, the fare for those going to places within walking distance of the new station will be actually less by three cents, after the opening of the tunnel, than it is now.

Press despatches of Thursday say that John B. Moissant, who on Wednesday crossed the English Channel in a Bleriot aeroplane, was born in Chicago. The statement that he was a Spaniard was due to the fact that he came to France from Spain and was a total stranger. The passenger whom he carried across the channel was his machinist, a Frenchman named Fileux, weighing 182 lbs. Moissant himself weighs 150, and the machine weighed about 800 lbs. His flight across the channel was taken in the course of his attempt to secure a prize which had been offered by a London newspaper for a flight from Paris to London. He was a stranger to the country through which he passed and kept his course by means of a compass, floating in glycerine, contained in an air-tight vessel, and placed between his feet. He was unable to continue his journey to London on Wednesday, both he and his passenger having been severely chilled by a cold rain which they faced during the latter part of their trip across the channel. He flew in the face of a west wind so high that experienced aeronauts thought he was foolhardy to start. He landed at Tilmaston, near Deal. The trip across the channel was made in 37 minutes. When he descended his eyes were bloodshot and greatly inflamed, this being due to the high wind beating the rain into his face. Moissant is about 40 years old.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

The Manufacturers' Railway, St. Louis, Mo., has ordered two switching locomotives from the Lima Locomotive & Machine Works.

General Dimensions.

Weight in working order	145,000 lbs.
Cylinders .....	.20 in. x 26 in.
Diameter of drivers .....	.51 "
Boiler, type	Extended wagon top
Tubes, number	300
" length	15 ft. 1½ in.
" diameter .....	.2 "
Firebox	65½ in. x 65¼ "
Water capacity	4,000 gals.
Coal capacity	7 tons

Special Equipment.

Bell ringer	Gollmar
Couplers	Sharon
Brakes	Westinghouse-American
Injectors	Ohio
Lubricators	Chicago
Flange oilers	Elliott
Packing	U. S. Metallic
Piston rods	Taylor iron
Safety valves	Crosby
Sanders	Leach
Steam gages	Crosby

CAR BUILDING.

The Kansas City, Mexico & Orient is in the market for 11 passenger cars.

The Southern Indiana has ordered 484 coal and 7 caboose cars from the Haskell & Barker Car Company.

The Denver & Rio Grande is reported to have ordered six automobile cars. This item is not confirmed.

The Texas & Pacific is building 300 flat cars in its Marshall, Texas, shops. It has also ordered two steel postal cars.

The New Orleans, Mobile & Chicago has ordered 200 flat cars and 100 box cars from the American Car & Foundry Co.

The Philadelphia & Reading has ordered 30 vestibule coaches, 5 vestibule combination cars and 6 baggage cars from Harlan & Hollingsworth Corporation.

The Nevada Northern, reported in the *Railway Age Gazette* of August 12 as being in the market for cars, has ordered 175 Ingoldsby dump cars from the Pullman Company. One hundred of these cars are for the Ray Consolidated Company and 75 for the Nevada Northern.

MACHINERY AND TOOLS.

The Atchison, Topeka & Santa Fe is in the market for a number of tools.

IRON AND STEEL.

The Detroit, Toledo & Ironton is in the market for 1,400 tons of structural steel.

The Department of Railways of Canada has ordered a swing bridge and two roller-lift bridges from the Canada Foundry Company.

The St. Louis, Iron Mountain & Southern has asked for bids on August 22 for a steel span bridge and approaches at Judsonia, Ark.

The Pennsylvania Lines West are in the market for 550 tons of steel for grade crossings in Chicago and 150 tons for additions to the Northumberland, Pa., shops.

The Pennsylvania is in the market for 2,000 tons of structural steel for a bridge over the Schuylkill river at Philadelphia. The company has also ordered 320 tons of structural steel from the American Bridge Company for the new two-span bridge at Petroleum Center, Pa.

General Conditions in Steel.—All reports indicate that the steel manufacturers are receiving only small orders, but that consumers continue to specify heavily against existing contracts. It is estimated that the United States Steel Corporation during the past three months has been shipping at a rate between 11,000,000 and 12,000,000 tons of steel per year. A continuation of this shipment rate depends upon new business received, although it is understood that the mills have sufficient orders booked to keep running at the present rate for several weeks to come. The feeling is general that there will be a strong revival of business in September and October.

SIGNALING.

The Rock Island expects shortly to install automatic, three-position, upper quadrant block signals with alternating current track circuits, between Gresham and Stony Island avenue (Chicago), on the South Chicago branch, 3½ miles of double track. This line is used jointly by the Rock Island and Baltimore & Ohio, and also, until the Grand Crossing elevation is completed, by the Nickel Plate and the Lake Shore.

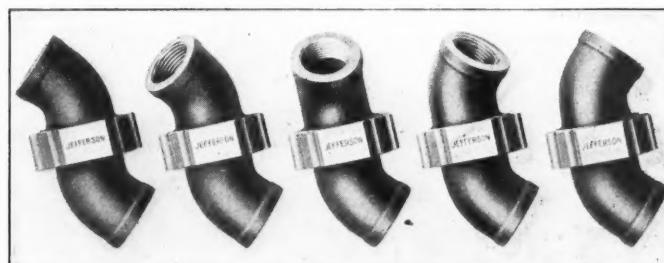
High Speed Brake Beams.

The Damascus Brake Beam Company, Cleveland, Ohio, exhibited two brake-beams at the Atlantic City conventions which were used in the Lake Shore emergency brake tests at Toledo. One of these was similar in design to the regular No. 1 Waycott special high-speed beam, except that it was made of larger sections. It was subjected to a load of 53,412 lbs. in service; under test it deflected 1/8 in. under a load of 50,000 lbs. The other beam was one of the standard Waycott high-speed beams, as furnished to the trade. In some of the Lake Shore test runs it was subjected to a load as high as 46,580 lbs. In the tests two cars were equipped with the heavy beams and eight cars with the lighter ones; at the conclusion of the tests all of the beams were found to be in perfect condition.

This company has also made a marked improvement in the trussed type of freight brake-beam by substituting steel forgings for the malleable iron castings used heretofore. It also has a patented adjustable brake head which can be changed to any desired position and is rigid after adjustment. This improved brake head has given remarkably successful results in service during the past year.

A New Swing Union.

The new swing union which is being made by the Jefferson Union Co., Lexington, Mass., consists of two 45-deg. elbow parts with a spherical iron-to-iron seat ground to fit, the two ends being connected by a brass or malleable iron nut. At slightly additional cost these unions can be made with the regular Jefferson brass-to-iron seat, which consists of a narrow brass or wrought metal ring sunk in a channel in which it fits tightly.



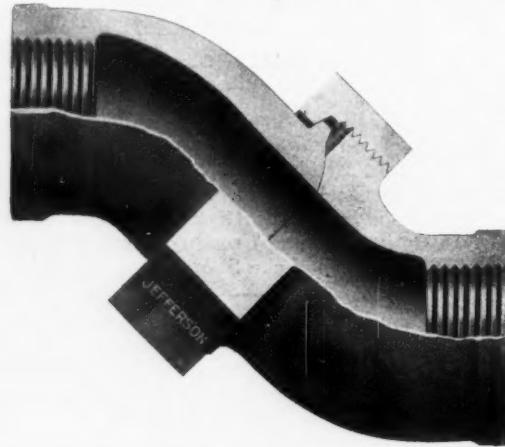
Five Positions of a Jefferson Union.

A lip of iron protects the brass ring from contact with the fluid, and also from injury, should the pipe be screwed in too far. For close work, the Jefferson swing union can be equipped with a special notched nut which can be set up with a bar of iron and a hammer.

The accompanying cuts show the union in various positions and the interior arrangement of the metal-to-metal joint. In the intermediate positions, it is possible to make connections between pipes at a great variety of angles, the joint always being

tight on account of the ground spherical seat. By using the combination of one end of the Jefferson swing union with the regular Jefferson parts, it is applicable to so many kinds of odd connections that it may almost be considered a universal union. It would require several more parts and much more time to accomplish by other means the same results as with the Jefferson swing union.

Owing to the necessarily irregular lines followed by piping around stationary and marine gas engines, automobile engines,



Part Sectional View of Jefferson Swing Union.

etc., this union is especially applicable. By using a iron-to-iron seat, these unions will withstand the high temperature of the exhaust from gas or gasoline engines. By using the male end of the regular Jefferson male and female union and a notched nut, connections can be made in a very short space. The materials used in the manufacture of these unions are selected with especial reference to their resistance to corrosion.

Steel Underframe Passenger Cars, Atlantic Coast Line.

The Atlantic Coast Line has recently placed in service six steel underframe passenger cars built by the Hicks Locomotive & Car Works, Chicago. The general appearance of the cars and the details of the steel underframe are shown in the illustration.

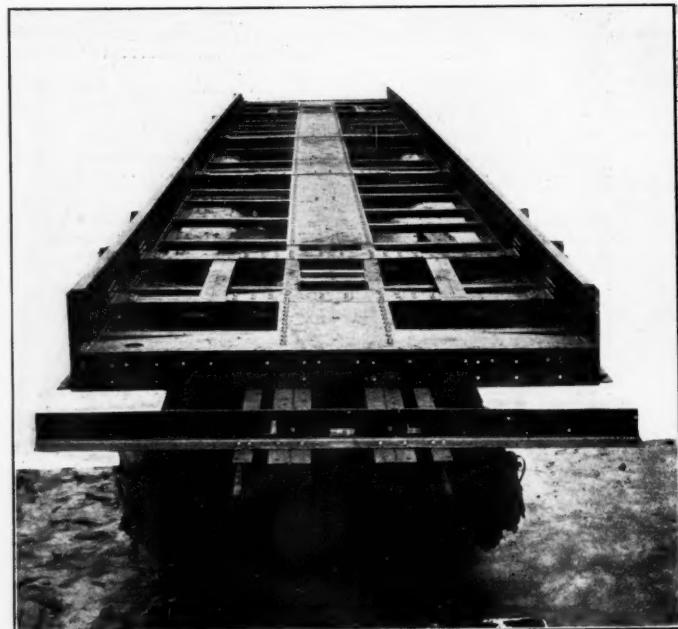
The general dimensions are as follows:

Length of frame over end sills.....	61 ft. 8 in.
Length over platforms about 68 ft. 3 in., not to exceed 69 ft. 2 in. over buffers, when uncoupled.	
Width over side sills.....	9 ft. 8 in.
Width over eaves.....	6 " 6½ "
Width of upper deck.....	5 " 6 "
Height from top of rail to top of upper deck.....	14 " 4 "
Height from top of rail to center of draw-bar.....	35 "
Height from top of rail to top of platform.....	4 ft. 3¼ "

The frame is of open hearth steel. The brakes are Westinghouse high-speed with high-speed reducing valve and American slack

adjuster J. Cylinder levers are adjusted on the basis of 80 per cent. of the light weight of the car with 50 lbs. pressure in air-brake cylinder. Lindstrom malleable brake handles are used in the vestibule, with malleable drop uncoupling handles. Forsythe Bros. Company buffer is used with Westinghouse friction draft gear.

The cars are piped to be heated by direct steam with radiators in each section independent. Pipes underneath the cars are

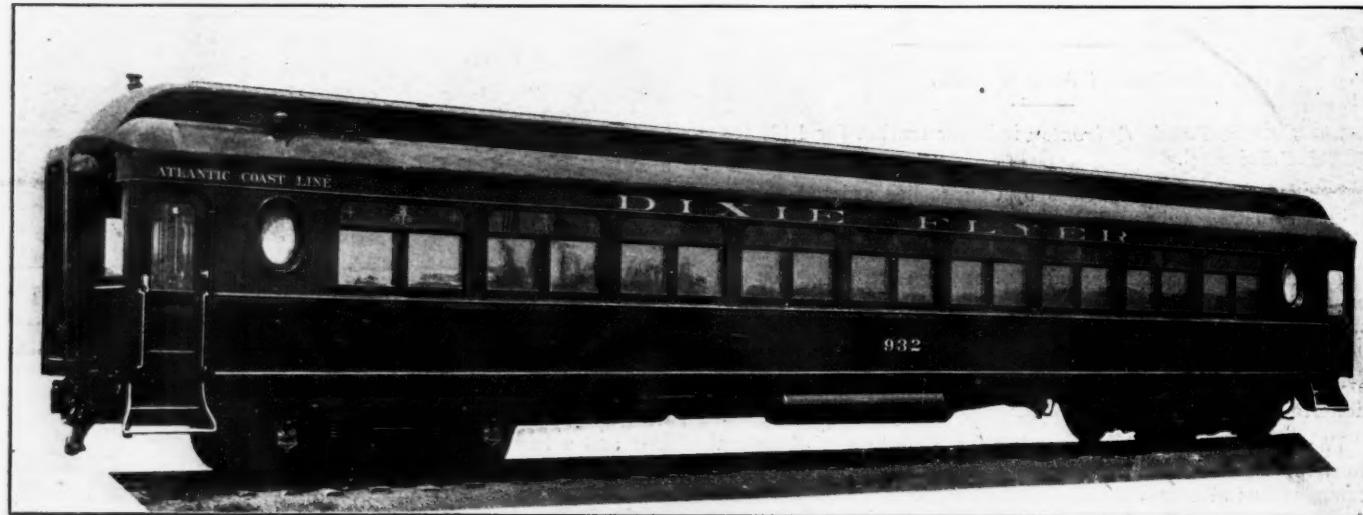


Steel Underframe of A. C. L. Coach.

covered with sectional pipe covering wrapped with heavy cotton cloth and painted for protection from the weather. The interior finish is quarter sawed oak with semi-empire deck and no carving or veneering. Interior finish of the vestibule is poplar grained mahogany. All workmanship is of high quality and the cars are very tasteful and neat in appearance.

Railway Extensions in Brazil.

The Great Western of Brazil Railway Co., Ltd., has contracted with the federal government to extend its lines in the state of Parahyba from the town of Guarabira, Independencia, to Picuhy, a small town situated in the interior at the foot of the Borborema mountains, some 108 miles from Guarabira and 168 miles from the city of Parahyba.



Steel Underframe Passenger Car; Atlantic Coast Line.

ANNUAL REPORT.

LEHIGH VALLEY RAILROAD COMPANY. FIFTY-SIXTH ANNUAL REPORT.

Philadelphia, August 10, 1910.

To the Stockholders of the

LEHIGH VALLEY RAILROAD COMPANY:

The Board of Directors herewith submit the fifty-sixth annual report of the business of your Company for the fiscal year ended June 30, 1910.

MILEAGE

The first track mileage owned or controlled and operated by the Lehigh Valley Railroad Company, the main line of which is double track, extending from Jersey City, N. J., to Buffalo and Suspension Bridge, N. Y., is as follows:

	Miles.
Owned, or controlled by ownership of entire capital stock.....	1,242.74
Controlled by ownership of majority of capital stock.....	115.87
Controlled by leases.....	27.88
Total mileage operated (owned and controlled).....	1,385.99
Trackage rights over railroads owned by other companies.....	47.03

Total first track mileage..... 1,433.02
 Of the above 597.19 miles, or 41.67 per cent. have second track, 62.24 miles have third track and 27.86 miles have fourth track. There are also 1,141.12 miles of yard tracks and sidings on the system, making a total of 3,261.48 miles of track in operation at the close of the year. The average number of miles of railway operated for the year, and upon which the mileage statistics in certain tables submitted in this report are based, was 1,440.25.

The decrease of 8.29 miles of first track and the increase of 9.13 miles of second track are due principally to a re-arrangement of the Deringer and Tomhicken Branches, heretofore operated as single track lines, which has enabled the use of a portion of the Deringer Branch as the second track of the Tomhicken Branch. The only other changes of importance in the mileage are those resulting from the construction of 5.77 miles of additional third and fourth track, mention of which is made elsewhere in this report.

OPERATING REVENUES AND EXPENSES

The gross operating revenues for the year, not including other income, amounted to \$36,167,398.17, an increase of \$3,029,565.96, or 9.14 per cent., over the preceding year, and are the largest in the history of the Company. It may be pointed out that the increases in revenue have occurred, with one exception, in each month of the year during a period when the general business of the country has not, to any appreciable extent, advanced, but on the other hand has during the last few months shown some evidence of receding. While the solicitation of both passenger and freight traffic has been actively carried on in competition with other lines, the increase may in large measure be ascribed to the high character of service rendered shippers and the traveling public, your management having consistently sought to improve the service, believing, as has undoubtedly been the case, that the revenues would respond to the improvement in the service.

Notwithstanding the high character of the service rendered and with a liberal allowance for maintenance and depreciation of the property, the operating expenses have increased but \$1,108,410.98, or 5.39 per cent., over the preceding year, and are actually lower than for the fiscal years 1907 and 1908, when the earnings closely approximated those of the present year. It is particularly gratifying to observe that the expenses have been so controlled that the major portion of the increase in gross earnings has been retained in the net operating revenues, making the total of the latter \$929,134.85 in excess of the best previous year. It is also pertinent to state that these results have been attained during a year when practically all the elements of cost entering into the expense of operation have materially advanced. One of the most serious of these is the increase in rates of wages granted to all classes of employees. While this has affected the results for the year it has only been in the latter months, as the more important increases did not apply until after January 1st.

The ratio of operating expenses to operating revenues was 59.95 per cent., a decrease of 2.14 per cent., as compared with the preceding year.

The following statement shows the gross revenues, expenses, and net revenue from the operation of the entire system for the fiscal year, not including other income, compared with similar figures for the fiscal year 1909.

GROSS OPERATING REVENUES

From	1910.	1909	Increase or Decrease.
Coal freight.....	\$15,821,797.62	\$14,831,670.78	\$90,126.84
Merchandise freight.....	14,757,799.34	13,291,830.90	1,465,968.44
Passenger.....	4,330,172.45	3,905,062.74	425,109.71
Mail.....	193,859.75	209,899.01	* 16,039.26
Express.....	462,437.70	406,225.72	56,211.98
Other transportation.....	356,165.22	307,725.75	48,439.47
Miscellaneous.....	245,166.09	185,417.81	59,748.78
Total operating revenues.....	\$36,167,398.17	\$33,137,832.21	\$3,029,565.96

*Decrease.

OPERATING EXPENSES

	1910.	1909.	Increase or Decrease.
Maintenance of way and structures.....	\$3,462,903.41	\$3,273,339.47	\$189,563.94
Maintenance of equipment.....	5,895,810.09	5,882,430.15	163,379.94
Traffic expenses.....	918,720.11	810,293.00	108,427.11
Transportation expenses.....	10,593,565.10	9,949,909.59	643,655.51
General expenses.....	713,148.52	709,764.09	3,384.48
Total operating expenses.....	\$21,684,147.23	\$20,575,736.30	\$1,108,410.98
Net operating revenue.....	\$14,483,250.94	\$12,562,095.91	\$1,921,155.03
Ratio of operating expenses to operating revenues.....	59.95%	62.09%	* 2.14%

*Decrease.

OPERATING REVENUES

COAL FREIGHT

The revenue derived from the transportation of coal, including coke, amounted to \$15,821,797.62, an increase of \$900,126.84, or 6.68 per cent., as compared with the previous year. Although the volume of bituminous coal offered for transportation has not been particularly heavy, the revenue

from that class of traffic, as well as from anthracite, has shown a substantial increase.

The percentage of coal freight revenue to total operating revenues was 43.75 per cent., a decrease of 1.01 per cent.

The coal and coke tonnage transported, not including supply coal, amounted to 14,034,396 tons, an increase of 761,260 tons, or 5.74 per cent.

The number of tons moved one mile amounted to 2,165,127.775, an increase of 147,514,126 ton miles, or 7.31 per cent.

The average haul increased from 152.01 to 154.27 miles, an increase of 2.26 miles, or 1.49 per cent.

The coal tonnage was 51.68 per cent. of the total tonnage hauled during the year, as compared with 53.39 per cent. for the previous year, being a decrease of 1.71 per cent.

MERCHANDISE FREIGHT

The transportation of merchandise freight produced a revenue of \$14,757,799.34, an increase of \$1,465,968.44, or 11.03 per cent., as compared with the preceding year. It is of interest to note that the increase in merchandise freight has been greater than in the case of coal freight. While every effort has been made to increase the latter, it has been the policy of your management in recent years to develop especially the merchandise traffic.

The percentage of revenue derived from the transportation of merchandise freight to total operating revenues was 40.80 per cent., an increase of .69 per cent.

The tonnage moved, exclusive of Company's material, was 18,147,141 tons, an increase of 1,561,072 tons, or 8.47 per cent.

The number of tons carried one mile amounted to 2,571,430,189, an increase of 191,234,501 ton miles, or 8.03 per cent.

The average haul decreased from 205.44 to 195.59 miles, a decrease of 9.85 miles, or 4.79 per cent.

GENERAL FREIGHT

The total revenue from both coal and merchandise freight was \$30,579,596.96, an increase of \$2,456,095.28, or 8.73 per cent., as compared with the previous twelve months.

The entire freight traffic amounted to 27,181,537 tons, being an increase of 2,322,332 tons, or 9.34 per cent.

The number of tons carried one mile was 4,736,557.964, an increase of 388,748,627 ton miles, or 7.70 per cent.

The average distance carried was 174.26 miles, a decrease of 2.65 miles, or 1.50 per cent.

The average revenue per ton was 112.50 cents, as against 113.13 cents last year, being a decrease of .63 cent, or .56 per cent.

Company's freight, not included in the above, amounted to 2,718,057 tons, an increase of 479,102 tons, or 21.40 per cent.

The total freight train mileage was 8,733,264 miles, an increase of 516,845 miles, or 6.29 per cent.

Revenue received per freight train mile was \$8.50, as compared with \$8.42, being an increase of \$.08, or 2.34 per cent.

The average train load of revenue freight was 542.86 tons, an increase of 7.11 tons, or 1.33 per cent. Including Company's freight, the average train load was 561.51 tons, as against 553.13 last year, an increase of 8.88 tons, or 1.52 per cent.

The average number of tons of revenue freight in each loaded car was 22.65 tons, a decrease of .20 ton, or .88 per cent. Including Company's freight, the average carload was 23.45 tons, a decrease of .17 ton, or .72 per cent.

PASSENGER

The receipts from passenger traffic amounted to \$4,330,172.45, an increase of \$425,109.71, or 10.89 per cent., as compared with the previous year. Following a recent decision by the Supreme Court of the State of Pennsylvania as to the law enacted by that State in 1907 reducing the rates of fare to a maximum of two cents per mile, the passenger rates in Pennsylvania in effect prior to that law will be restored.

The total number of passengers carried was 5,172,961, an increase of 296,160, or 6.07 per cent.

The number of passengers carried one mile increased 24,289,815, or 10.88 per cent.

The average revenue per passenger was 83.71 cents, an increase of 3.64 cents, or 4.55 per cent.

The average revenue per passenger per mile was 1.749 cents, showing no change as compared with the previous year.

The average distance traveled by each passenger was 47.86 miles, an increase of 2.07 miles, or 4.52 per cent.

Passenger train mileage was 4,150,858, an increase of 136,076 miles, or 3.39 per cent., whereas the traffic increased 10.89 per cent.

The revenue from passengers per passenger train mile was 104.32 cents, an increase of 7.05 cents, or 7.25 per cent. The average number of passengers per train was 59.65, an increase of 4.08, or 7.25 per cent., and the average number of passengers per car was 17.24, an increase of .63, or 3.79 per cent.

MAIL

The pay received for the transportation of United States mails amounted to \$193,859.75, a decrease of \$16,039.26, due entirely to the change in the method employed by the Government in arriving at the average amount of mail carried at the time of the reweighing, which occurred last year; the new rates becoming effective at the beginning of the fiscal year.

EXPRESS

The express revenue amounted to \$462,437.70, an increase of \$56,211.98.

OTHER TRANSPORTATION

The revenue derived from transportation other than that shown under the preceding headings was \$356,165.22, an increase of \$48,439.47.

MISCELLANEOUS

Miscellaneous revenue amounted to \$245,166.09, an increase of \$59,748.78.

OPERATING EXPENSES

MAINTENANCE OF WAY

The expenditures for maintenance of way and structures amounted to \$3,462,903.41, an increase of \$189,563.94, or 5.79 per cent., over the preceding year. The property has been fully maintained as its usual high standard.

During the year six new bridges were constructed of steel. Twenty-eight steel bridges and ten concrete-steel bridges, replacing light iron or wooden bridges, were built. Eleven small bridges were replaced by pipe culverts and eight bridges abandoned and the openings filled. Three wooden overhead highway bridges were replaced by steel bridges and one removed.

Bridges on the Auburn and Ithaca Branch have been renewed and strengthened, enabling the use of heavier power on that section of the road.

The policy of laying drain tile in wet cuts has been continued on a large scale, 60,378 feet being used during the year, resulting in a more stable roadbed, with lower cost of maintenance.

One hundred and twenty-two thousand one hundred and seventeen cubic yards of crushed stone were used for the purpose of fully ballasting additional track and repairing tracks previously ballasted with stone.

One hundred and sixty-four thousand five hundred and seventy-seven feet, or 31.17 miles, of company's sidings and 23,390 feet, or 4.43 miles, of industrial sidings were constructed.

Eighteen thousand two hundred and fourteen tons of new 90-pound rail, together with necessary frogs, switches, etc., were placed in the track.

Three hundred and twenty-two thousand seven hundred and ninety-three tie plates were used.

Five hundred and forty-four thousand seven hundred and forty-seven cross ties, 1,587,000 feet B.M. switch ties, 691,389 feet B.M. bridge ties and lumber amounting to 2,450,976 feet B.M. were used during the year.

Twenty-four and twenty-one-hundredths miles of telegraph and telephone pole line were rebuilt and 63.00 miles reset. Five hundred and forty and fifty one-hundredths miles of new copper, 47.10 miles of new iron, 59.79 miles of second-hand copper and 15.30 miles of second-hand iron wire were used in extending telephone, telegraph and signal wires. Fifty-four and forty one-hundredths miles of iron wire were used in replacing worn-out wires in the same service.

Pier B, Jersey City, destroyed by fire in March, 1909, was restored as an open pier at a cost of \$45,430.

In order to enable large vessels to reach the ore and coal dock at the Tiff Farm Terminal a channel 22 feet in depth is being dredged, for which \$20,525 has been expended.

MAINTENANCE OF EQUIPMENT

The total expenses for the maintenance of equipment during the year amounted to \$5,993,810.09, an increase of \$163,879.94, or 2.80 per cent., as compared with the previous twelve months. This increase is due principally to the extensive repairs made to the freight equipment generally as a result of the increased traffic handled by the Company. The equipment is in excellent condition, and reflects the wisdom of liberal expenditures for maintenance during past years. Included in the expenses for the year is an arbitrary charge of \$1,004,698.58 for depreciation of equipment, in compliance with the accounting regulations of the Interstate Commerce Commission.

New equipment was purchased during the year and charged to additions and betterments. The equipment acquired consisted of twenty freight and eight switching locomotives, eleven hundred 100,000-pounds capacity steel gondola cars, nine hundred 80,000-pounds capacity steel underframe box cars, one hundred and fifty steel underframe refrigerator cars, two hundred steel underframe automobile cars and eleven caboose cars. Two steam wrecking cranes, four locomotive cranes, one electric magnet crane and one spreader car were also purchased. In addition orders were placed for eighteen steel passenger coaches, ten passenger locomotives, five switching locomotives and other equipment, delivery of which will be made during the early part of the next fiscal year.

Twenty-seven wornout locomotives were disposed of and their book value written off by an appropriate charge through operating expenses.

Three passenger coaches, one combination passenger and baggage car, 562 freight equipment cars and 220 road service cars were condemned and destroyed during the year.

Three chair cars were converted into passenger coaches and one combination car into a baggage and mail car. Four passenger coaches and seventeen freight equipment cars were transferred to road service.

Seven hundred and sixty-nine locomotives received heavy and general repairs, an increase of forty-four over the previous year.

Fifteen passenger equipment cars were rebuilt, one dining car was remodeled, and two baggage and mail cars rebuilt to conform to Government requirements.

Four hundred and thirty-four passenger equipment cars were painted and varnished, five equipped with wide vestibules, and five with standard steel platforms. Twenty-one passenger cars were equipped with new standard steps and five with new steel trucks.

Steel underframes were applied to 2,700 wooden freight cars, making a total of 3,532 cars so equipped during the last two years. The cost of doing this work has necessarily increased the expense for repairs, but will be more than offset by a considerable saving hereafter in maintenance. Twenty-three thousand two hundred and forty-seven freight equipment cars received heavy repairs.

The total number of locomotives at the end of the year was 874, with a tractive power of 24,254,993 pounds, an increase of 551,943 tractive pounds. The total number of freight equipment cars was 44,158, with a capacity of 1,595,667 tons, an increase of 1,782 cars and 89,872 tons.

TRAFFIC EXPENSES

The expenditures under this heading amounted to \$918,720.11, an increase of \$108,427.11 over the previous twelve months. This is due to increased expenditures for the solicitation of passenger and freight traffic, the establishment of additional agencies for this purpose and a more liberal appropriation for advertising, all of which have materially aided in increasing the business. The cost of printing and filing tariffs as required by law has also increased these expenses.

TRANSPORTATION EXPENSES

The total cost of conducting transportation was \$10,593,565.10, an increase of \$643,655.51, or 6.47 per cent., as compared with the preceding year. The higher rates of wages paid employees is the principal reason for the increase in this class of expense. The ratio of transportation expenses to total operating revenues was 29.29 per cent., as compared with 30.08 per cent. last year, a decrease of .74 per cent.

GENERAL EXPENSES

The expenses for general administration amounted to \$713,148.52, an increase of \$3,384.48, or .48 per cent., over the previous year. While the general increase in rates of wages granted by the company to employees had a serious effect on these expenses, it has, to some extent, been offset by reductions made in other directions.

TAXES

The taxes accrued on your property and business during the year amounted to \$1,106,761.89, or 3.06 per cent. of the company's revenue, an increase of \$27,355.66 over the preceding year.

FLOATING EQUIPMENT

The floating equipment of the Company has been thoroughly maintained and increased by the purchase of seventeen coal barges and one 23-car steel float. One work boat was built for use in New York Harbor. Orders have been placed for additional equipment, consisting of two steel car floats, a steel tug and open lighters and barges. One steam lighter has been converted into a fueling vessel: one barge, covered by insurance, was abandoned to underwriters as the result of an accident, and one old car float was sold.

The floating equipment in New York Harbor or engaged in coastwise business was as follows:

1 wrecking boat	20 tugs
212 barges	25 car floats
1 hoisting boat	4 work boats
1 fuel lighter	5 steam lighters
	8 cattle floats

Extensive repairs were made to the equipment comprising the fleet on the Great Lakes. The vessels, all of which are of steel, are as follows:

Name.	Capacity.	Name.	Capacity.
Wilkes-Barre	6,000 tons	Seneca	3,000 tons
Mauch Chunk	6,000 tons	Saranac	3,000 tons
Bethlehem	3,000 tons	Tuscarora	3,000 tons

ADDITIONS AND BETTERMENTS.

Liberal expenditures were made throughout the year for the acquisition of additional property and facilities and for the improvement and development of existing property. The total expenditures for additions and betterments amounted to \$5,205,205.10, of which \$843,877.30 was deducted from Income. This policy of liberal expenditures for improvements must continue in such measure as the resources and business of the Company will, from time to time, justify, if your property is to be fully developed and its earning capacity increased. With the exacting demands upon railroads in the matter of service, it is of prime importance to provide facilities for the prompt movement and delivery of freight, not only to retain the present traffic, but to provide for its increase. Of equal importance are those expenditures which must be made for the removal of grades, reduction of curves, extension of third and fourth tracks, enlargement of yards and improvement of terminals to offset the constantly increasing cost of transportation.

Your Board has recently authorized the construction of a single track branch from Lumber Yard to a connection with the main line at Hays Creek, a distance of about twelve miles, with the necessary classification yard, engine house, shop for light car repairs and fuel and water facilities, at an estimated cost of \$1,500,000. The construction of this line will materially reduce the cost of operation by providing a shorter route for westbound traffic from the Mahanoy and Hazleton regions, and by enabling the classification of coal shipments in the vicinity of the mines, thus avoiding the congestion at Packerton and the reverse movement at Penn Haven Junction. In addition to facilitating the movement of freight by reducing the distance to be hauled, the new line will remove a large volume of traffic from a part of the road where very heavy grades are now encountered. The construction of this branch will also obviate the necessity for additional yard tracks at Penn Haven Junction, which would soon be needed to relieve what threatens to become a serious congestion at that point. The final surveys are now being made preliminary to the active construction of this new branch, which will be prosecuted in such a manner as to enable the economical double tracking thereof at a later date, if deemed advisable.

Surveys are also being made for double tracking the line between Laurel Junction and Silver Brook Junction, a distance of about six miles, the construction of which will shortly be commenced. This line connects at both ends with double track, and in addition carries the traffic of the New Boston branch, with the result that it is badly congested. The proposed improvement is necessary not only to facilitate the movement of the present traffic, but to provide for the increase which will result from the opening of the Lumber Yard-Hays Creek Branch. When this work is completed your Company will have a continuous double track line from Mount Carmel and Gum Run Junction to Lumber Yard.

The work of extending third and fourth tracks through congested territory has been actively continued. Extensions from Redington to Richards Farm, a distance of 1.91 miles, and from Gap Junction to a point west of Fullerton, including a change of alignment at the latter point, a distance of 1.38 miles, are completed and the tracks in service, making a continuous four-track system in this section of 15.89 miles. A further extension from Fullerton to Cementon, a distance of 4.29 miles, is in course of construction. The aggregate expenditures during the year were \$293,809.

In extending the four-track system through South Bethlehem, a decided improvement in the alignment is being made by eliminating a sharp reverse curve in the main line. This will also render available space for an ultimate yard development of 1250 cars capacity. The expenditures on this account were \$61,304.

An extension was also made of the fourth track from Park Avenue, South Plainfield, to Potters, a distance of two miles, completing the four track line in this territory from New Market to Potters, a distance of six miles. In connection with this work one and a quarter miles of track east of Potters was raised a maximum of eight feet, effecting a considerable reduction in the grade. The total expenditures for this improvement were \$43,378.

A receiving track 2.4 miles long was constructed at the west end of Perth Amboy Yard and four additional tracks were laid, increasing the capacity of the yard by 350 cars at a cost of \$88,984. This has rendered possible a saving in expenses by reducing the switching.

To relieve the sidings and yard tracks and provide storage for cars awaiting repairs, storage tracks were laid in Sayre yard, with a capacity of 250 cars, at an expense of \$6,186.

Revisions of line were made, eliminating sharp reverse curves at Meshoppen and Kittredge, at an expense of \$80,596. At the former point the tracks were changed for a distance of 3,000 feet, and at the latter point for a distance of 2,600 feet.

Owing to the surface sinking, due to mining operations of outside companies, it became necessary to re-grade the track between Shenandoah Junction and Packer No. 4 Colliery, and in connection therewith the alignment was improved. The work was started during the previous fiscal year and is now practically completed, the total cost to date being \$53,885.

Additional tracks were constructed at the Tiff Farm Terminal, the cost being \$40,948. This has enabled an interchange at that point instead of at East Buffalo with connecting railroads, effecting a considerable saving in expenses. It has also afforded the necessary additional room in which to make up solid trains for eastern terminals, thereby reducing the switching expense at intermediate yards.

The construction of the new high grade line at Greenville, mentioned in the last annual report, was completed soon after the close of the year, and the same is now in operation. The total amount expended on this work to date is \$384,594.

At West Danby the work of changing the alignment, which has been in progress for some time, was completed, the expenditures for the year amounting to \$41,192. The change in track covered a distance of about one mile and has reduced the curvature by 109 degrees.

The Tomhicken and Deringer Branches, heretofore operated as single track lines, have by the construction of an additional track between Long Run Junction and Cranberry Junction, a distance of 1.4 miles, and by the use of the Pennsylvania Railroad tracks between Tomhicken and Gum Run, been put in operation as a double track line between Hazleton Junction and Gum Run, a distance of 10.4 miles.

The Perth Amboy Branch has been equipped with upper quadrant

automatic block signals. Block signals have also been installed at Oneida Junction, Audenreid and Delano Yard, and a new interlocking plant at the outlet of the westbound yard at Packerton. Additions were made to the plants at South Plainfield and South Easton. One five-track and two four-track signal bridges have been erected.

A combined heating and electric lighting plant was built at Wilkes-Barre to furnish heat for the passenger and freight station and coaches, and lighting for the various buildings and platforms, at a cost of \$11,660.

New combined passenger and freight stations were erected at Honeoye Falls, East Waverly and Interlaken, and a new passenger station at Freeville, the aggregate cost being \$39,466.

The freight station and yard at Allentown were raised and the driveways paved with stone. A new freight transfer platform was also constructed with a modern fire protection system. Team delivery tracks and stone paved driveways were installed at South Bethlehem and Ithaca.

A large capacity air compressor was purchased for use at South Easton shop, at a cost of \$11,120, and an electric battery renewal plant was installed at Packerton at a cost of \$2,051.

Extensive improvements were made to milk shipping stations at Clinton, West Portal, Three Bridges, Jutland, McAdams, Truxton, Groton and Interlaken.

A 30-ton electrically operated crane was installed at the 149th Street Terminal, New York City. Additional facilities were provided at 124th street, New York City, consisting of a new freight shed, crib and bulkhead, at a cost of \$11,636.

The ore dock at the Tiff Farm Terminal on Lake Erie was improved and two large capacity cranes purchased for loading vessels. A special crane equipped with a magnet was also purchased for handling shipments of pig iron at that location. The cost of this work in connection with an improvement to the Hamburg Turnpike amounted to \$85,312.

Improvements in ash track and engine house facilities have been made at several points to admit of more prompt and economical operation. New concrete coal and ash pits were installed at Lehighton and Delano and a concrete ashpit at Jersey City, all of which are operated with locomotive cranes. Similar cranes have also been provided for use in handling fuel and ashes at Cortland and Auburn. Twelve-inch water cranes were installed at Deep Hollow, Gardners Run and Tagues Eddy, and ten-inch water cranes at Jersey City, Packerton and Hazleton Shops.

Telephone train despatching lines have been installed on the Mahanoy & Hazleton Division and on the New Jersey & Lehigh Division in Pennsylvania, at a cost of \$27,815. Additional lines are in course of construction on the Wyoming, New Jersey & Lehigh and New York Divisions.

FINANCIAL

Your Board of Directors, after due consideration, has deemed it to the best interest of the stockholders to finance the needs of the Company for additional cash funds by the issuance and sale of common capital stock. Accordingly the Board, acting with the approval of the stockholders, given at a special meeting held June 22d, last, has authorized an increase in the common capital stock of the Company from \$40,334,800 to \$80,000,000, and the issuance and sale of \$20,220,550, or 404,411 shares of such additional stock to shareholders at par, this being in the proportion of one share of new stock to two shares of old stock. This will provide the Company with \$20,220,550 in cash, which will be used to pay the \$6,000,000 Seven Per Cent. Second Mortgage Bonds maturing September 1st, 1910, for the retirement of other obligations and for those expenditures generally which may be necessary to enable the Company to render adequate and proper transportation service in the territory reached by its lines of railroad. The balance of the authorized but unissued common capital stock will be reserved for future needs.

The outstanding obligations of the Company were reduced during the year by the sum of \$2,490,000, representing the maturity of \$1,000,000 Collateral Trust Four Per Cent. Bonds, the retirement of Equipment Trusts Series D and G, amounting to \$500,000 (the payment of the latter series which became due August 1st, 1910, having been anticipated before the close of the fiscal year), and by the payment of maturing instalments on Series H, I and J to amount to \$900,000. The Trust Agreements D and G have been cancelled and the title to the equipment pledged thereunder vested in your Company. There is now outstanding in the hands of the public but one Equipment Trust obligation, Series J, in the sum of \$3,750,000. Equipment Trusts Series H and I are in the treasury and available should occasion arise.

The retirement of the obligations mentioned, together with the maturity of \$6,000,000 Second Mortgage Seven Per Cent. Bonds falling due September 1st, 1910, will effect an annual saving hereafter of \$505,000 in the fixed charges.

The many water operations owned and conducted by your Company, originally acquired for the purpose of protecting and maintaining an adequate water supply for the system, have grown to considerable magnitude and importance. In the development of these properties it has been necessary to advance, from time to time, funds for the enlargement and improvement of the several plants. To provide the additional capital required for the future extension thereof a comprehensive financial plan has been adopted. In connection therewith and to effect that economy which results from concentration, the operations have been placed under the management of one Company, viz.: The Wyoming Valley Water Supply Company, the entire capital stock of which is owned by your Company. This has been accomplished by leasing thereto all the property of the various water companies. The Wyoming Valley Water Supply Company further acquired by purchase from the Lehigh Valley Railroad Company all of the capital stocks of the Hazleton Water Company, Locust Mountain Water Company, Beaver Meadow Water Company, Blackwood Water Company, Centralia Water Company, Citizens Water Company of Tremont, Delano Water Company, Denison Township Water Company, Driftont Water Company, Oneida Water Company, Tomhicken Water Company and Wright Township Water Company; also \$300,000 bonds of the Hazleton Water Company and \$125,000 bonds of the Locust Mountain Water Company. For the payment thereof the Wyoming Valley Water Supply Company increased its capital stock from \$1,000 to \$100,000 and created a first mortgage securing an issue of \$2,000,000 fifty-year 5 per cent. gold bonds, the latter secured by a pledge of all of the real estate, water rights, pumping plants and pipe lines, owned or hereafter acquired, as well as the stocks and bonds above named. The Water Supply Company delivered to your Company at par its increased capital stock and \$895,000 of its bonds in payment for the stocks and bonds of the several water companies and for certain advances made to them, not previously reimbursed. The balance of the bonds secured by the Wyoming Valley Water Supply Company mortgage will be issued thereunder as additional funds are necessary. The capital stock and bonds received from the Water Supply Company are in your treasury, the bonds being available for such future needs as may arise.

Complying with the orders of the Interstate Commerce Commission requiring that all additions and betterments made to the property since June 30, 1907, no matter whether paid for out of income or not, be set up as a capital asset, expenditures of that nature made on the line of the Lehigh Valley Railroad Company have been included on the balance sheet under Road and Equipment. A large part of the additions and betterments

made to the system, however, has been on the property of subsidiary companies in the names of which the title to the improvements becomes vested. These additions and betterments were, therefore, brought on the books as advances to those companies and have been reimbursed to the Lehigh Valley Railroad Company by the subsidiary companies creating and issuing fifty-year 5 per cent. gold debenture bonds in amounts as follows: The Lehigh Valley Railway Company, \$825,000; Lehigh Valley Railroad Company of New Jersey, \$1,200,500; Loyalty Railroad Company, \$7,500; Lehigh Valley Transportation Company, \$422,000; Pennsylvania and New York Canal and Railroad Company, \$325,500, and Montrose Railroad Company, \$3,500. These debentures have been placed in the treasury or pledged as collateral under the general consolidated mortgage of September 30, 1903, as required thereby.

The Philadelphia Grain Elevator Company, to which your Company has from time to time advanced varying sums of money in promoting the shipping and grain business of the port of Philadelphia, represented by notes of that Company, underwent a financial reorganization and \$203,000 of its capital stock was issued and received in lieu thereof.

Your Company sold \$220,000 bonds of the Mutual Terminal Company of Buffalo, the proceeds being used for capital expenditures.

The charter of the Buffalo, Thousand Islands and Portland Railroad Company, a corporation organized some years ago in connection with the New York Central and Hudson River Railroad Company for the purpose of building an additional line from Buffalo to the Niagara Frontier, having expired by limitation, and the necessity for the construction of such a road having passed, a new corporation, the Fair Land Realty Company, was organized to take over and dispose of in such manner as may be most advantageous to the real estate held by the former Company. The capital stock of the Fair Land Realty Company amounts to \$5,000, and is owned one-half each by the New York Central and Hudson River Railroad Company and your Company. The stock of the Buffalo, Thousand Islands and Portland Railroad Company was cancelled and an appropriate entry, charging off its value, was made to profit and loss account.

There have been outstanding for many years five shares of the capital stock of the Schuylkill and Lehigh Valley Railroad Company. These were acquired during the year upon favorable terms, and the entire capital stock of that subsidiary company is now owned by your Company.

The form of general balance sheet submitted in this report is that prescribed by the Interstate Commerce Commission. The changes therein, whereby the profits of the Company have apparently been increased, are due entirely to orders issued by that commission prescribing methods of accounting over which your officers have no control. While the methods in certain particulars would seem to be somewhat at variance with conservative accounting and have produced charges to capital account which, in the opinion of your management, should have—and if left to their discretion would have—been absorbed in operating expenses, nevertheless your Company has endeavored to comply in all respects with the various orders issued by the commission. The most notable innovations ordered in the balance sheet are: First, an arbitrary date, June 30, 1907, is taken for the investment account, road and equipment; second, all expenditures after that date for investment in road and equipment, or additions and betterments, must be charged to "Investment since June 30, 1907," whether paid for out of income or not; third, the credit resulting from depreciation of equipment from June 30, 1907, must be deducted from road and equipment account, instead of being available for the replacement of equipment as heretofore; fourth, additions and betterments charged to income since June 30, 1907, must be restored as above stated and credited to profit and loss. These changes necessarily disturb, to a considerable extent, comparisons between the present balance sheet and those in previous reports, and although appropriate explanation is hereinafter made of all those increases and decreases in the Company's assets and liabilities, which represent material changes as compared with June 30 last, no attempt has been made to explain all the apparent discrepancies which are due solely to the adoption of the commission's classification in place of that heretofore used by your Company. In this connection, more or less difficulty has been experienced in interpreting the order requiring a certain classification of the various stocks and bonds owned by the Company, particularly in determining whether securities are marketable or not, and whether those shown as investments might be available for sale, if the necessity arose.

The reserve for accrued depreciation of \$2,886,720.50 deducted from road and equipment account is in pursuance of the orders of the Interstate Commerce Commission making it necessary to restore to equipment replacement reserve those sums which had been charged to this account for equipment purchased for replacement purposes, in accordance with the commission's previous orders. The reserve in question, therefore, represents the depreciation accrued by the Company since June 30, 1907, less the amounts applying to equipment taken out of service.

The decrease in the real estate account is due in the main to the requirements of the Interstate Commerce Commission that all real estate owned by the Company and used for railroad purposes be carried in road and equipment account. There was also transferred from real estate account to advances to subsidiary real estate companies the cost of certain properties, the titles to which are in the names of the respective real estate companies.

The value of the so-called Coxe Properties decreasing as the coal is mined therefrom, the sum of \$1,000,000 was appropriated from the general reserve fund and applied in reducing the book value thereof, as represented by the ownership of the capital stock of Coxe Brothers & Company, Incorporated. In view of the small balance remaining in that reserve it has been closed by a transfer to profit and loss account.

The charge of \$49,809 to profit and loss account for property abandoned at Delano is in accordance with the Government's requirements, and represents a few antiquated shop buildings, engine house and similar structures, the necessity of which has passed.

The increase in other income shown in the item miscellaneous is due principally to increased per diem charges and interest on the Company's cash funds.

The value of materials and supplies on hand at the close of the year amounted to \$1,895,916.70, a decrease of \$188,282.81.

Working assets are \$19,498,618.11 in excess of working liabilities.

The usual dividends of 10 per cent. upon the preferred capital stock and 6 per cent. upon the common capital stock were declared during the year, payable in January and July, 1910, as semi-annual dividends of 5 per cent. and 3 per cent., respectively.

Following the usual practice, the accounts of the Company for the fiscal year have been examined and the cash and securities verified by certified public accountants, the result of which is set forth in the accountants' certificate.

GENERAL REMARKS

The conditions now surrounding the railroad operations in this country present an element of uncertainty and apprehension that should receive the sober and earnest reflection of investors generally. Time and experience alone will demonstrate the benefit or harm attending the methods employed by Federal and State authorities in the regulation and control of the vast industries of this country. The greater difficulties now encountered in corporate management are apparent to all. The problem of offsetting the increase in rates of wages paid employees and in all of those

costs entering into the expense of operation must be met. The logical and businesslike solution in this, as in any other occupation, would be an advance in the rates for service performed. If for any reason, however, the gross revenues cannot be so increased, the constantly increasing cost of the service will diminish the net revenue of the Company, and it becomes, therefore, of the utmost necessity to effect the greatest possible economies in operation. This problem of keeping the expenses of the Company within reasonable and well-defined limits, without any impairment of its physical well-being, has been given the most careful study and attention by your management, and many improved methods and economies have been introduced which have materially reduced the units of cost to various branches of the service.

The policy has been continued of discarding locomotives of small tractive power and obsolete design for heavier power capable of hauling a greater tonnage. Freight cars of limited capacity, expensive to maintain by reason of their age, have been torn down and replaced by steel cars of large capacity. In the case of wooden cars of fair capacity and in generally serviceable condition, steel underframes have been substituted for those of wood. These improvements in the character of the equipment, combined with the reduction in grades and straightening of alignment, a policy which will continue as the future may justify, have resulted in increasing the average number of tons of revenue freight in each train from 485.58 tons for the year 1908 to 542.86 tons, or 56.84 tons. This increase in the train load naturally results in a corresponding decrease in the cost per ton-mile.

The extension of third and fourth track and the construction of additional passing sidings in the territory of greatest traffic density, with the important additions that have been made to yards at terminals, have been of decided benefit in not only reducing the expense for overtime, but in accelerating the movement of trains.

The experiments conducted by the Company in the matter of despatching trains by telephone instead of by telegraph have been successful, and on that portion of the road so equipped the change has resulted in a safe and prompt movement of trains. It is being rapidly extended to all parts of the line.

Notwithstanding the greatest economy, the operation of the Lehigh and New York Railroad has resulted for the year in a further loss of \$126,476.96. This property, as has heretofore been stated, is operated under a lease executed in the year 1895, which has been far from profitable. The matter is a vexatious one, in view of the fact that your Company is the owner of a majority of the capital stock of that Company, and also the endorser of \$2,000,000 of its bonds. Every effort is being made to work out a satisfactory solution.

No real estate of any importance was acquired during the year except that needed for extending the third and fourth track system, the enlargement of yards and changes in alignment, in which cases the real estate so acquired has been added to the road and equipment account. The Company recently acquired possession under a long-term lease from the city of New York of Pier 34, North River, at the foot of Canal street. This pier is advantageously located in the center of a district which both originates and receives a large volume of traffic.

The property of the Glen Summit Hotel and Land Company, which passed through foreclosure proceedings, as stated in the last annual report, has been sold. Other than a mortgage taken in partial payment, your Company now has no interest in this or any other hotel property.

The matter of encouraging and developing the local freight and passenger business is one that has received active attention, and much has been accomplished in this direction by the industrial department. The scope of that department has been considerably broadened, and an agricultural expert of reputation has been engaged by the Company, whose duty it is to explain in a practical manner to all interested along the line of the road methods that will produce an increase in the yield of farm products. During the year 74 new industries were located on the line of road, direct track connections being made with 24 of them.

Fifty-six and ninety one-hundredths per cent. of the total operating expenses, including outside operations, or \$13,863,851.03, was paid direct to labor, being distributed among an average of 22,469 employees during the year.

The contributions made by the Company to its employees' relief fund for the year amounted to \$48,644.33. This fund was established over thirty years ago for the benefit of injured employees and their families, membership in the same being open to all employees in the service. The Company contributes an amount equal to that paid by the members and assumes the cost of handling and disbursing the fund. Payments are under the control of the company, and are made with the approval of a relief fund committee composed of employees.

Messrs. William H. Moore, Daniel G. Reid and Edward S. Moore were elected directors of the Company, succeeding Messrs. Robert C. Lippincott, George H. McFadden and Irving A. Stearns, whose terms of office expired.

The board desires to acknowledge and thank the officers and employees of the Company for the faithful and efficient services rendered by them during the year.

By order of the Board of Directors,

E. B. THOMAS, President.

PROFIT AND LOSS ACCOUNT OF THE RAILROAD COMPANY FOR THE YEAR ENDED JUNE 30, 1910

	Dr.	Cr.
Balance, July 1, 1909.....	\$19,212,252.00	
Dividends:		
Five per cent. on preferred stock, paid July 10, 1909.....	\$5,315.00	
Two per cent. on common stock, paid July 10, 1909.....	806,696.00	
Extra one per cent. on common stock, paid July 10, 1909.....	403,848.00	
Five per cent. on preferred stock, paid January 8, 1910.....	5,815.00	
Three per cent. on common stock, paid January 8, 1910.....	1,210,044.00	
Total Dividends.....	\$2,430,718.00	
Book value of securities of Buffalo, Thousand Islands & Portland R.R. Co. written off.....	334,884.92	
Property abandoned at Delano, Pa.....	49,809.38	
Expenditures for Additions and Betterments during fiscal years 1908, 1909, and 1910, transferred to Road and Equipment and to Advances to Subsidiary Companies.....	3,440,777.96	
Miscellaneous adjustments.....	88,688.45	
Net income for year ended June 30, 1910, Table No. 1.....	7,293,523.58	
Balance, June 30, 1910.....	27,219,779.64	
	\$80,035,191.94	\$80,035,191.94

Balance brought forward, July 1, 1910..... \$27,219,779.64

COMPARATIVE INCOME ACCOUNTS OF THE RAILROAD COMPANY FOR THE YEARS ENDED JUNE 30, 1910 AND 1909.

	1910.	1909.	Increase, or Decrease.
Revenue from operation:			
Coal freight revenue.....	\$15,821,797.62	\$14,831,670.78	\$90,126.84
Merchandise freight revenue	14,757,799.34	13,291,830.90	1,465,968.44
Passenger revenue.....	4,330,172.45	3,905,062.74	425,109.71
Mail revenue.....	193,859.75	209,899.01	*16,039.26
Express revenue.....	462,487.70	406,225.72	56,211.98
Other transportation revenue	356,165.22	307,725.75	48,439.47
Miscellaneous revenue.....	245,166.09	185,417.31	59,748.78
Total operating expenses.....	\$36,167,398.17	\$33,137,832.21	\$3,029,565.96
Operating expenses:			
Maintenance of way and structures.....	\$8,462,903.41	\$8,273,339.47	\$189,563.94
Maintenance of equipment.....	5,995,810.09	5,832,430.15	163,379.94
Traffic expenses.....	918,720.11	810,293.00	108,427.11
Transportation expenses.....	10,593,565.10	9,949,909.59	643,655.51
General expenses.....	713,148.52	709,764.09	3,384.48
Total operating expenses.....	\$21,684,147.23	\$20,575,736.30	\$1,108,410.93
Ratio of operating expenses			
to operating revenue.....	59.95%	62.09%	*2.14%
Net operating revenue.....	\$14,483,250.94	\$12,562,095.91	\$1,921,155.03
Taxes.....	1,106,761.89	1,079,376.23	27,385.66
Operating income.....	13,376,489.05	11,482,719.68	\$1,893,769.37
Other income:			
Outside operations—			
Water lines.....	†148,800.93	†150,019.20	6,218.27
Other operations.....	†2,582.31	†3,268.83	736.52
Investments:			
Dividends on stocks.....	544,945.50	436,772.56	108,172.94
Interest on bonds.....	24,860.17	42,814.48	*17,954.31
Interest on real estate mortgages.....	15,983.83	15,604.13	329.20
Miscellaneous.....	678,229.34	362,677.20	315,552.14
Total other income.....	\$1,117,635.10	\$704,580.84	\$413,054.76
Total income.....	\$14,494,124.15	\$12,187,300.02	\$2,306,824.13
Deductions from income:			
Interest on funded debt...	3,609,398.34	3,544,060.00	65,333.34
Interest on equipment trust obligations.....	190,716.00	245,902.50	*55,186.50
Rentals of leased lines and guaranties.....	2,316,473.00	2,316,473.00	.....
Miscellaneous deductions...	240,140.98	237,061.31	3,079.67
Additions and betterments..	843,877.30	582,643.22	261,234.08
Total deductions from income.....	\$7,200,600.62	\$6,926,140.03	\$274,460.59
Net income.....	\$7,293,523.53	\$5,261,159.99	\$2,032,363.54

*Decrease. †Deficit.

LEHIGH VALLEY COAL COMPANY.

The Board of Directors' annual report of operations conducted by The Lehigh Valley Coal Company for the fiscal year ended June 30, 1910, shows that the net income from operations amounted to \$1,136,542.98, an increase of \$761,090.82, as compared with the preceding year.

The total production of anthracite coal from the lands owned and controlled by The Lehigh Valley Coal Company and affiliated companies was 8,092,940 gross tons, an increase of 358,862 tons, or 4.64 per cent., as compared with the previous 12 months. The improved earnings of the Company are, in the main, due to the increased sales of coal, the demand for which was greater than during the previous year, and to the fact that the mining has been so conducted as to counteract wherever possible the constantly increasing cost of operation, naturally resulting from the greater depth and extension of the underground workings.

The usual sinking fund payments, as required by the various mortgages on the property, have been made and amount to \$183,075 for the year.

The Advance Royalty Account has been reduced by the sum of \$24,288.46. Current Assets are \$5,680,512.24 in excess of Current Liabilities, a net increase over the preceding year of \$782,361.61.

PROFIT AND LOSS ACCOUNT OF THE COAL COMPANY FOR THE YEAR ENDED JUNE 30, 1910.

	Dr.	Cr.
Balance, July 1, 1909.....		\$2,272,897.45
Miscellaneous adjustments.....	\$15,097.76	.....
Net income for year ended June 30, 1910.....		1,136,542.98
Balance, June 30, 1910.....	3,393,442.67	
	\$3,409,440.43	\$3,409,440.43
Balance brought forward, July 1, 1910.....		\$3,393,442.67

Balance brought forward, July 1, 1910..... \$3,393,442.67